

# The MINING CONGRESS JOURNAL

Volume 11

APRIL, 1925

No. 4

## STANDARDIZATION ISSUE

### Mine Fan Installation

Mine Locomotives in Thick and Thin Coal

Standardization of Mine Tracks and Signals

Standardization Applied to Arizona Smelters

National Standardization and the Mining Industry

Mining Standards Before Correlating  
Committee

Metal Mine Fire Fighting Organization

Economy of Preserving Mine Timbers

Standardization of Drill Steel

Size and Shape of Drifts and Drift Timber

Sharpening Drill Steel

Booster Fan—Advantages and Disadvantages

Air Shafts and Air Ways

Progress in Standardized and Approved Coal  
Mining Practice and Equipment

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# Modesty in Claims

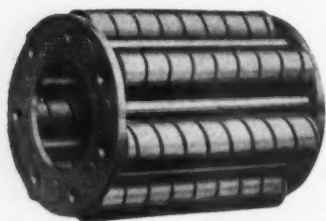
is oftentimes commended. It is right that it should be. Frequently, however, we are too modest when we do not claim more for Hyatt mine car bearings than we do, as the following experience would indicate.

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(Be sure to see the Hyatt exhibit at the National Exposition of Coal Mining Equipment and Machinery, Cincinnati, Ohio, May 25th to 29th.)



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# THE MINING CONGRESS JOURNAL

APRIL, 1925

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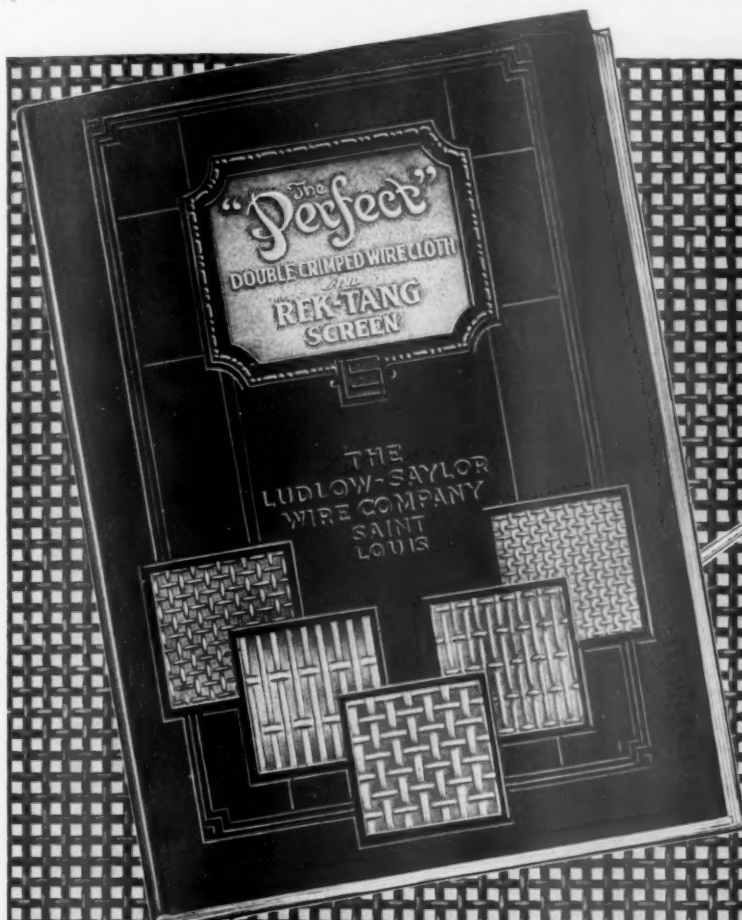
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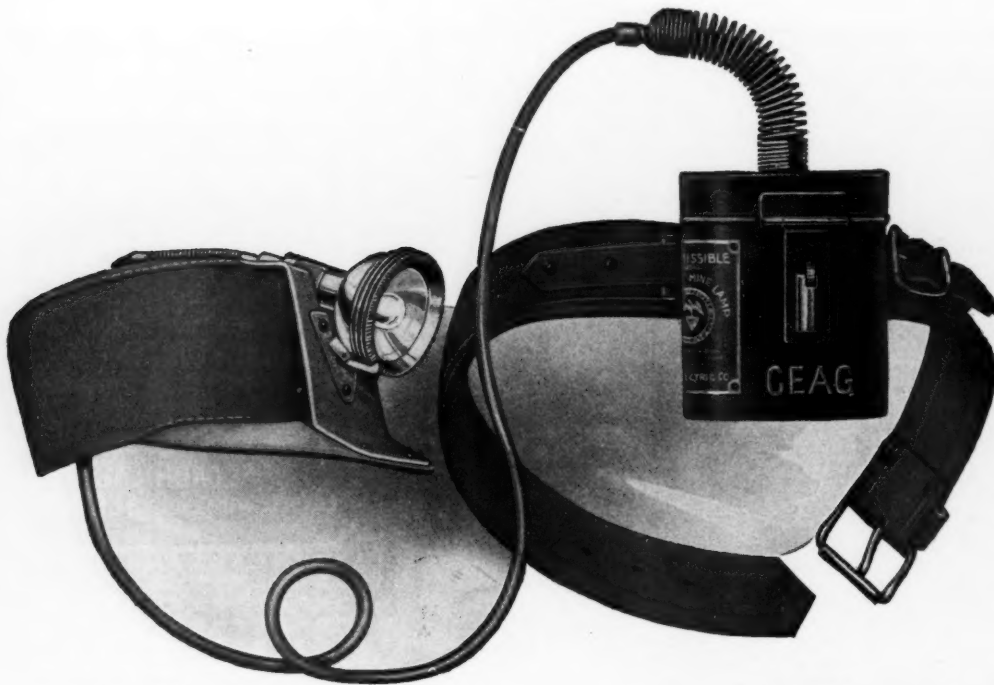
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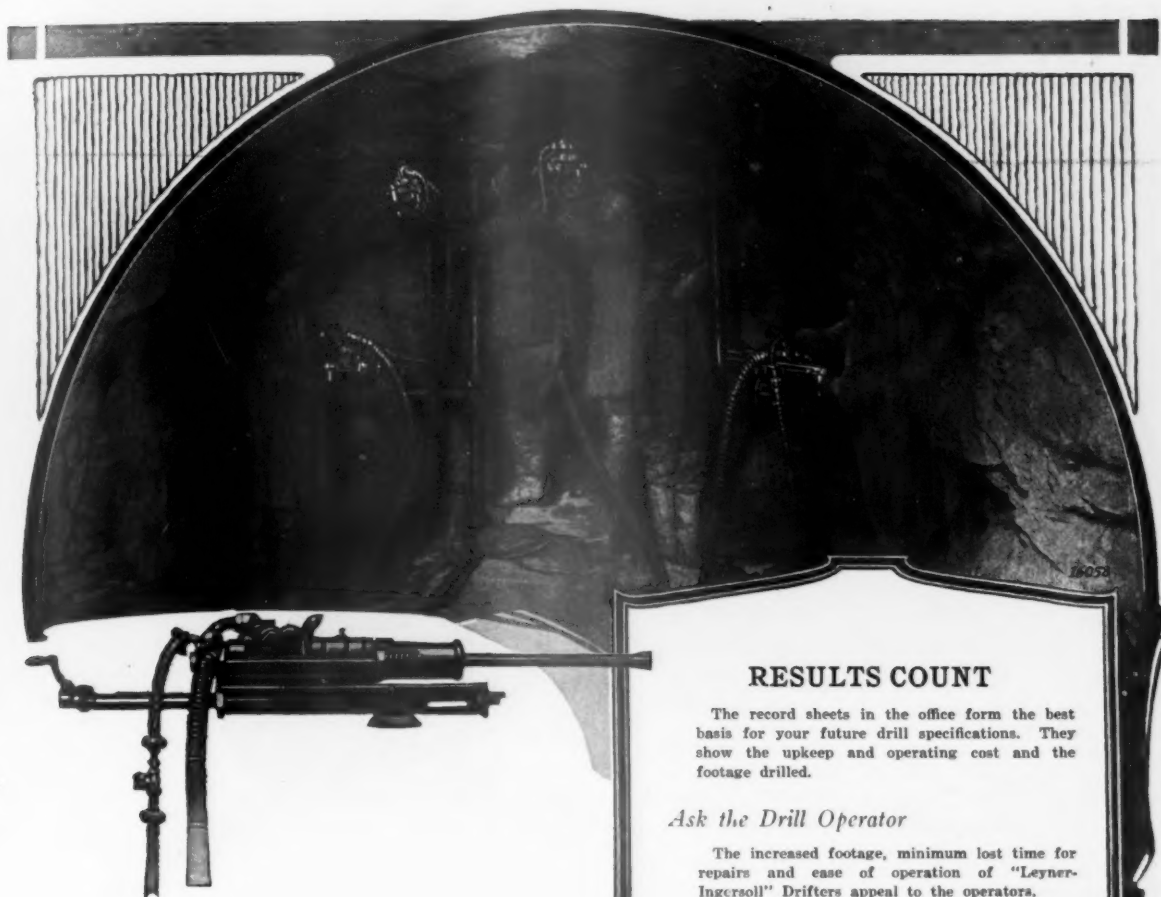


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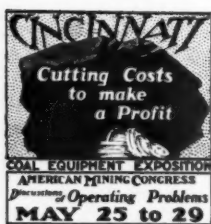
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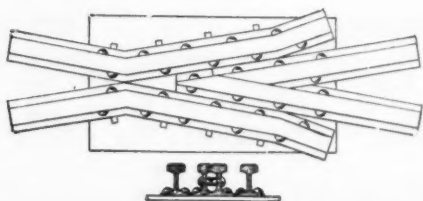


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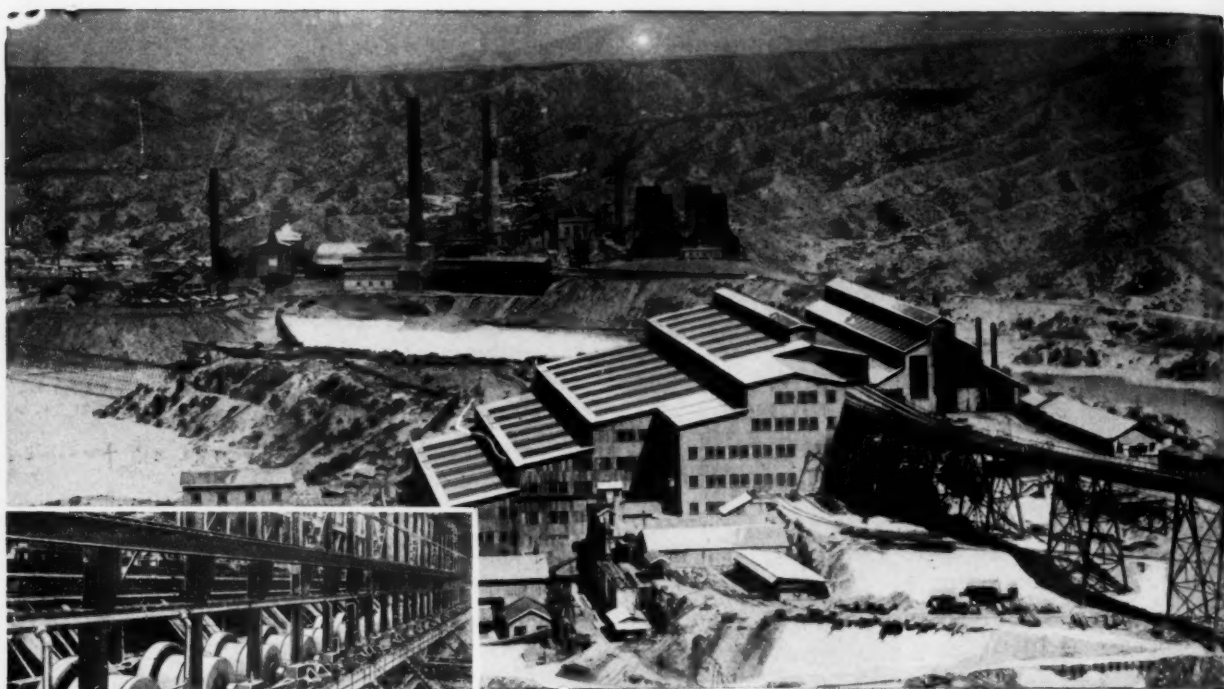
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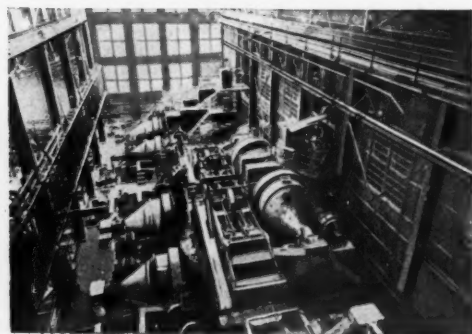




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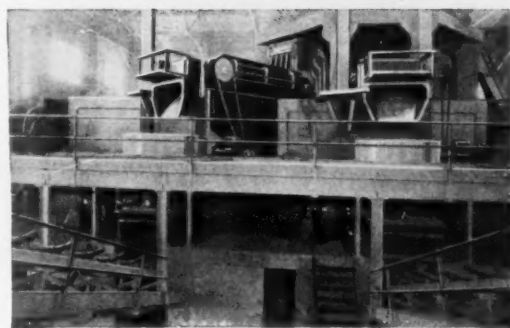
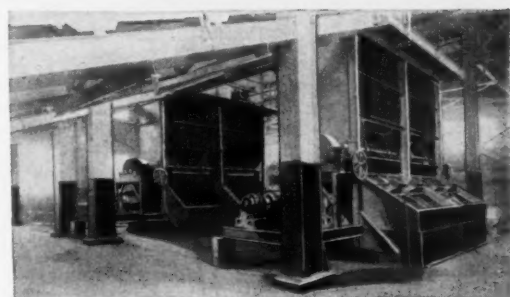
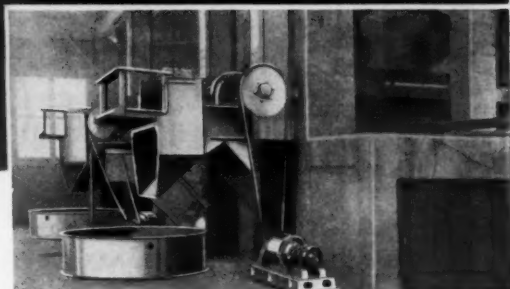


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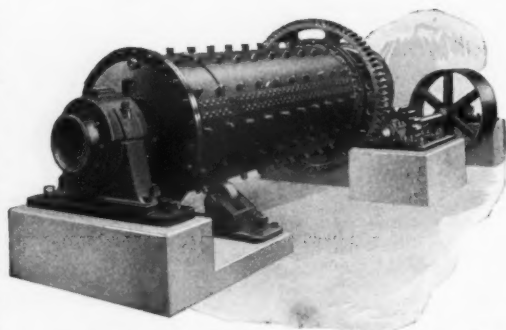
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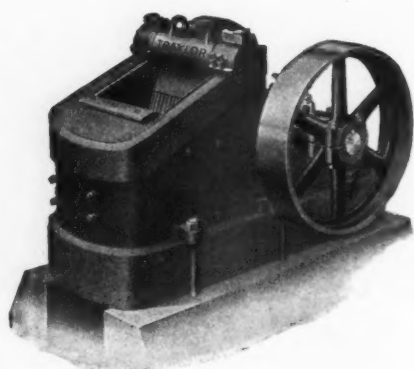
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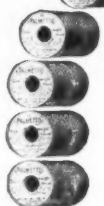
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## BALANCE

*or produce  
at a lower cost"*

# Eight big mining Companies report on the use of "GUNITE"

*Excerpts from the 1924 Committee Report on Mine Timbering (Metal Mining Branch) to the Standardization Division of the American Mining Congress.*

**Old Dominion Company** use 1/2-inch to 3/4-inch coat of "Gunite" on rock walls of x-cuts and drifts where necessary to prevent air slacking. "Gunite" very effective where ground sloughs or ravel, due to lack of coherence in rough particle. With timber at \$35 per M, "Gunite" is 25 percent cheaper than timber; Gunited sections have stood for three years and more; expect "Gunite" to outlast timber where there is no heavy pressure to walls.

**St. Joseph Lead Company** use 1/2-inch coating of "Gunite" on pillars to prevent sloughing; results satisfactory.

**Britannia Mining and Smelting Company** used "Gunite"

as lining in underground transformer station to seal wet formation.

**American Zinc Company** use "Gunite" to waterproof bulkheads, and to concrete fissures and large crevices; results satisfactory.

**Hecla Mining Company** use "Gunite" as lining to two stations on 2,000-foot level to prevent sloughing of limestone walls.

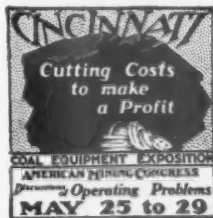
**Ray Consolidated Copper Company** use "Gunite" linings in drifts where air is bad and timbers subject to rot, also where necessary to prevent air slacking of ground. Cost of 1/4 to 1/2-inch "Gunite" coating applied direct to rock, \$0.033 to \$0.047 per square foot.

**Butte and Superior** have used "Gunite" lining for cross-cuts to prevent sloughing of walls where air is hot and humid; results satisfactory where there is no faulting or ground movement. Use 1/2 to 3/4-inch coat.

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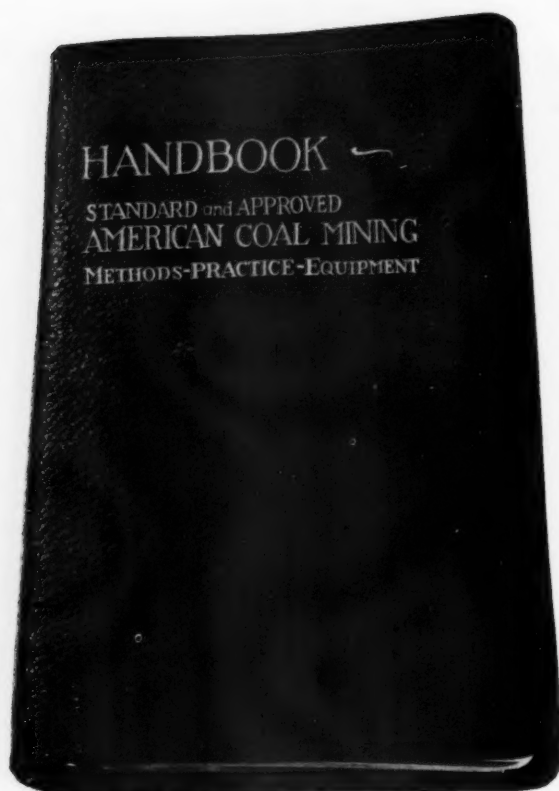
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Underground Transportation  
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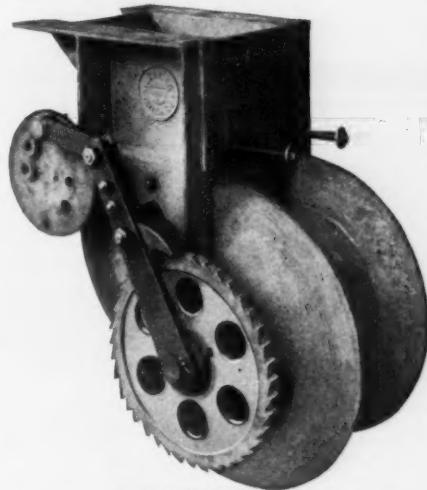


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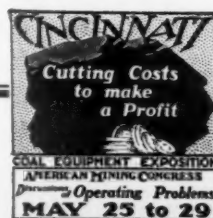
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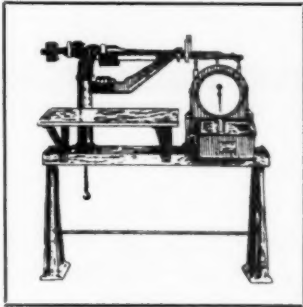


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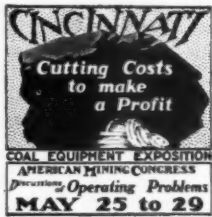
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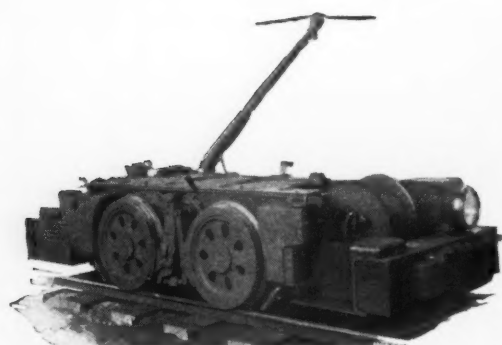


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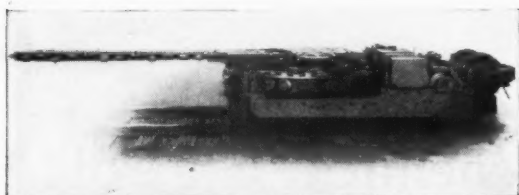
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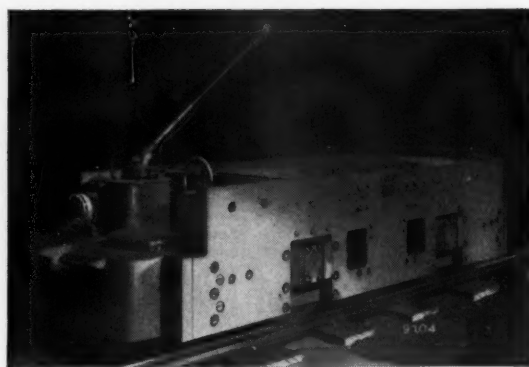
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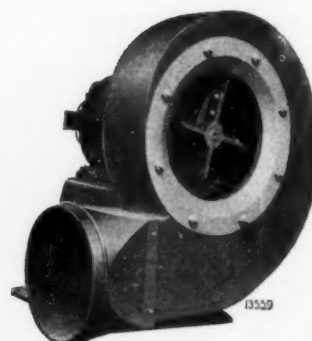
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## *A Way To Cut Mining Costs*

**F**IVE years of constructive effort, combined with energetic perseverance has shown remarkable results in the Standardization movement. From a very modest beginning, attempting to simplify electrical equipment in both coal and metal mines, the work has grown in magnitude and importance until all of the major problems of the mechanical operation of a mine are included in the scope of the work of the Standardization Division of The American Mining Congress. This Division has submitted for approval of The American Engineering Standards Committee, and the mining industry at large, eleven major reports covering that number of mechanical equipment problems, and has correlated these recommendations into a Handbook of Standard and Approved Mining Practice, which has just been published.

The work has been handicapped from its inception by individual and public misconception of the term "Standard." Standardization does not necessarily mean uniformity in the broad sense; it does not anticipate that everything about a mine must be performed in the same manner as every other mine; nor that all shafts must be sunk in a definitely prescribed manner. It does mean that there is a "standard" or "best" manner in which all mine equipment can be handled, and the recommendations of the Division, which is composed of 470 leading mine operators, engineers and manufacturers, attempts to embody the best practice available to the industry for the installation, upkeep and control of mechanical equipment.

In emphasizing the need for simplification and standardization, Mr. C. B. Lakenan, General Manager of the Nevada Consolidated Copper Company, in an address before the Fifth National Standardization Conference, said:

"Operating men dealing with labor-saving devices and with costs come almost daily in contact with useless duplications or modified designs which mean nothing in the art but additional grief to the repair gangs and warehouseman who must supply the necessary parts.

"Instances of waste in American industry due to multiplicity of design are so common as to need no discussion. Inspection of the junk piles of most large operating plants will be convincing of this, and a close inspection of any average hardware or general supply store will only emphasize the first impression.

"Happily there appears to be a way out through elimination of waste, through standardization, through quantity production, and through higher labor efficiency. We must lack vision if we do not move fast for the solution through these four avenues."

That statement is typical of the operator's viewpoint for the necessity of applied standardization. The manufacturers have been giving wholehearted cooperation, as witness the statement before this same conference, of Mr. A. S. Uhler, of the Ingersoll-Rand Company:

"Several years ago, in Denver, the then Chairman of the Standardization Committee asked the Ingersoll-Rand Company, the Denver Rock Drill Company, and the Sullivan Machinery Company, to have their engineers interchange their drawings on hose, fittings, hose connections and hose couplings, so that, instead of a mine being equipped with ten or fifteen kinds of spuds, couples, nets, etc., they would have just one kind. It then came to the question of a standard. These engineers carefully went over the entire situation, and at last, because the Ingersoll-Rand Company had sold more 1-inch hose couplings than the other manufacturers it was decided to adopt the Ingersoll-Rand 1-inch hose coupling as the standard. Therefore the Denver Rock Drill Company and the Sullivan Machinery Company and Ingersoll-Rand Company interchanged drawings and made all arrangements to furnish the mining industry with such couplings of standard requirements, regardless of which company from which they purchased."

A glance at the personnel of the Standardization Division, given in this issue, will convince the most skeptical of the practicality of the work. To quote one of the leading mining engineers of the coal industry, "The recommendations of the committee on Mine Ventilation alone is worth thousands of dollars to any mining company"; and a prominent operator, whose letter is on file in the office of the Division, asserts "If the Division never does anything else, the recommendations of the Committee on Coal Mine Transportation will remain an outstanding achievement in the economical operation of a coal mine."

The work of the Division is predicated upon Safety, Efficiency and Low-Costs in mining operation. Its recommendations are available to the industry and every property that is striving to reduce its costs, that wishes to attain maximum results with minimum expenditure, will do well to seriously adopt them.

### ONE KIND OF COOPERATION

**I**N England, recently, one colliery company having lost about a quarter of a million pounds sterling decided to quit. The miners took over the abandoned property and began to work it on the cooperative basis. This was the first venture of its kind in the history of coal mining in Great Britain and, coming immediately after the fall of the labor government was commented upon with many evidences of surprise. It was considered either as ominous or as ushering in a new order of industrial things.

In the United States, such experiences are not so uncommon and have been taken as a matter of course until recently. In fact, when the Colorado strike was in progress in 1914, one of the officials of the United Mine Workers of America was reported to have said in a public address that the miners intended to pile on their demands until the operators could no longer afford to pay the wages demanded and still sell their coal at any price which the public would consent to pay. He predicted the operators would ultimately abandon their mines to the miners who would work them on the cooperative basis.

Shortly thereafter, the first cooperative mines made their appearance in the mid-continent field. There, as one man expressed it, "the miners worked below ground all day; came out in the evening; washed their faces; and, became the board of directors." In this case, the quality of the coal was poor; the market price was exceptionally low; and the operators were at the end of their financial resources. When the war broke out, the movement toward cooperative production, which showed signs of spreading into other districts, was arrested while prices were attractive. It has now been revived as a result of the market chaos following the signing of the Jacksonville scale.

When it came time to sign the Jacksonville scale, some of the mines in the Southwest found themselves in such a position they had no option but to refuse. Half of their market—that to the south—had been taken away by the discovery and use of oil. The other or northern half of their market was demoralized by the strength of competition offered by eastern coal. These operators could not pay the Jacksonville scale and live. The union would not modify the scale to meet the oil competition. Therefore, the mines had to close, throwing the miners out of work. The latter decided, instead, to work with the operators on the cooperative basis—accept a percentage of the price of coal as their wage. The latter was done on rather a large scale.

This spring, the same situation and movement appeared in Ohio—about the last place where such a thing might be expected. However, the mines on the north side of the Ohio river were forced to pay the Jacksonville scale while the mines immediately south of the river paid another and a lower scale. The operators could not retain their property because they had reached the end of their financial resources. If the mines were closed, thousands of miners would be thrown wholly out of work and the surrounding community would suffer destruction. In an attempt to salvage the situation, the miners took over many of the properties and are now trying to operate them on a cooperative basis. In one case, the miners bought the mines outright, paying for them on the installment plan. Each miner became a stockholder and thus, by investment, came to have a "vested right in his job." In other instances, the mines

were simply leased. In the latter cases, the miners take 60 percent of the selling price of the coal as their wages and cost of supplies and allow 40 percent for selling and various capital charges.

The announced purpose of the Jacksonville agreement was to eliminate the "unnecessary" mines. In the face of the record, just written, the scale did not do what was expected of it. It has not closed an unnecessary mine even though it has bankrupt the owners of many mines and, in places, has changed the whole form of control. Its one concrete result has been to introduce into coal one of the greatest economic experiments in history and at the same time a factor of surpassing uncertainty and danger—the latter especially, if safety in mines hinges on careful planning and discipline.

### THE MENACE OF SUPER-TAXATION

**O**PPRESSION of the iron-making industry of Minnesota in the form of double-taxation and super-taxation is leading to conditions that threaten the general welfare of that great state, as predicted by this JOURNAL in June, 1923, following the decision of the Supreme Court, holding valid the Minnesota iron-ore tax. At that time, it was predicted that the exuberance of the ore tax advocates was so great that agitation for increased taxation and new revenue-raising proposals would be encouraged. And the accuracy of this prediction is indicated by the following resolution which the executive committee of the Duluth Chamber of Commerce has recently found it necessary to adopt:

"This committee wishes to go on record as stating its belief that general mine taxation in Minnesota, and continued agitation session after session of plan after plan for increasing taxes on iron ore in this state, tends only to immediate exploitation of all known deposits of merchantable ore and to the retardation of development of the unknown until such time as they may be required, and then to their rapid exhaustion. In other words, it is directly opposed to the conservation of the state's iron ore resources. It has killed the industry of exploration for additional ore bodies; it has ruined holders of undeveloped ore lands, and already has brought foreign and Eastern competition in iron ores sold to steel makers east of the Alleghenies that will have a serious effect on the industry in this state."

In view of conditions that exist in Minnesota, as shown by this resolution, this JOURNAL feels justified in repeating its conclusions of two years ago that, "Other sections, particularly those having large undeveloped iron deposits, will not be slow to recognize the opportunity afforded to encourage the development of their mineral resources with capital which normally would find its way to the iron-making industry of Minnesota."

The lamentable thing is that foreign producers may be the ones who will reap substantial benefits as the result of this policy which in effect penalizes home industry and development of resources. Should foreign iron production, which enjoys cheap labor, negligible taxation and low ocean freight rates, be enabled to compete in American markets with Minnesota iron, either in raw or fabricated form, the welfare and steady employment of thousands of citizens employed in the Minnesota mines would be placed in jeopardy. And all because of the influence of an element in state politics whose attitude toward private property is intolerant and confiscatory.

### REVALUATION OF METAL MINES

**N**EARLY three years ago the Metals Valuation Section of the Income Tax Unit secretly recommended to the Commissioner of Internal Revenue that all copper and silver mining properties be revalued as of March 1, 1913, or other basic date for valuation purposes. The factors involved in the original basic valuations of most of the silver and copper companies were determined and fixed by the Metals Valuation Section in 1919 and 1920. The recommendation referred to termed these original valuations "provisional valuations," notwithstanding the fact that on the basis of these valuations many refund claims had been paid by the Treasury, many abatement claims had been allowed, and many copper and silver companies had paid additional taxes assessed against them.

Either payment of additional taxes or allowance of refund and abatement claims presumably had the effect of closing the cases of the companies for the years involved and of fixing the basic valuations to apply for subsequent years, since only one basic date of valuation was involved for all years. In other words, the revenue law made it incumbent upon the revenue department to determine valuations as of a basic date, and these valuations, once determined and established supposedly could not be departed from in subsequent years even though subsequent history might show variations and fluctuations from year to year in the property values as of later dates.

This has operated against the taxpayer in most cases, and the revenue department has never permitted a taxpayer to increase his basic valuation for depletion or depreciation purposes because operations of subsequent years showed his property to be of greater value than was evident at the basic date. Thus, in the case of a taxpayer whose earnings subsequent to the date of valuation of his property, demonstrated that the property was under-valued, the revenue department has not permitted a revaluation whereby the greater value could be reflected in increased depletion or depreciation allowances.

Early in 1922, the Metals Valuation Section came to the conclusion that copper and silver properties had been "over-valued." The secret recommendation resulted. The American Mining Congress on or about June 23, 1922, learned that the Commissioner of Internal Revenue on June 30, would consider the matter of reopening the copper valuations for 1917 and subsequent years, and immediately notified leaders of the copper industry to be present. The Metals Valuation Section's memorandum to the Commissioner was still secret, so secret, in fact, that it was not known that silver companies were involved.

On June 30, a hearing was held before Mr. C. P. Smith, then Assistant Commissioner. About thirty copper companies were represented. Only one company was even partially prepared to meet the issue presented. The others had had no opportunity to prepare for the hearing. But even at this hearing the nature of the Metals Valuation Section's memorandum was not disclosed, and silver was not mentioned. That was the only general hearing held. That was the only opportunity given the copper industry to defend its rights. The silver industry was given no consideration whatever.

In February, 1923, the American Mining Congress received the first intimation that a blanket revaluation plan recommended by the Metals Valuation Section had been approved by the Commissioner and that this plan applied to silver as well as copper. Verbal protests were made to officials of the Internal Revenue Bureau, but

without avail. And it was not until May, 1923, that the memorandum recommending this blanket revaluation plan was released to the mining industry by the Bureau. At that time it was learned that the Commissioner had disapproved the application of the plan to the years 1917 and 1918, and that the Metals Valuation Section would proceed to close the cases for those years before taking up the matter of revising the basic valuations for 1919 and subsequent years.

The American Mining Congress continued to protest against this arbitrary and manifestly unjust plan, and on April 11, 1924, according to testimony before the Couzens Committee of the Senate, the Commissioner issued another order excepting silver from the blanket revaluation plan. The American Mining Congress then made formal protest to the Commissioner against the blanket revaluation of copper companies. This protest was under consideration, and action on the revised copper valuations was held up pending this consideration, when the whole question was decided without warning against the industry and the Metals Valuation Section was permitted to proceed with the general revaluation of both silver and copper properties. The testimony taken by the Couzens Committee indicates that the investigation influenced this action. The next step was the demand for waivers for 1919 by the department and a threat that jeopardy assessments would be made unless waivers were submitted.

Since then the ex parte testimony of agents of the Couzens Committee has been released. This testimony makes it appear that copper and silver properties were grossly overvalued, and that the Treasury has lost an enormous amount of taxes. The copper and silver industries again were not granted hearings, although hearings are now promised. But as the record now stands, these industries have been indicted, tried, and convicted without a hearing.

It should be remembered that the final valuations of most of the companies as determined and fixed by the Metals Valuation Section in 1919 and 1920 were so determined and fixed after the Treasury Department had made a searching investigation into the various factors involved, employing for that purpose a staff of eminent mining engineers, economists and statisticians to arrive at a proper basis after an exhaustive study and numerous conferences with the various mining companies interested. In this connection the copper companies expended large sums of money in securing maps and data and in the attendance of their engineers, attorneys and officers for long periods of time in Washington, who in every way endeavored to give the Department all necessary facts essential to a proper determination of the basic valuations.

The valuations so determined and fixed were in no sense "provisional" as now alleged by present officials of the Metals Valuation Section. Some valuations made in 1918 and 1919 were marked "provisional," but these "provisional" valuations were revised to conform to the basic factors determined and prescribed for the guidance of the Department's engineers in making adjustments of valuations, and these valuations thereupon became final and superseded the so-called "provisional" valuations. Notwithstanding all this, an attempt is now being made to set aside these valuations and to substitute in lieu thereof revised valuations that are based to a great extent purely on differences of opinion between representatives of the Metals Valuation Section now acting and those who previously represented the Government.

### ECONOMIC FACTORS IN RATE-MAKING

A GENERAL investigation of the rate structure of common carriers subject to the Interstate Commerce Act has been instituted by the Interstate Commerce Commission. Congress directed this action. In this investigation economic conditions affecting the several industries of the country will receive more careful consideration than ever before. This, too, by direction of Congress. Heretofore, the Commission has held that economic conditions could not be considered a controlling factor in rate-making. Congress declares "that the conditions which at any given time prevail in our several industries should be considered in so far as it is legally possible to do so, to the end that commodities may freely move."

Among the economic factors that should be considered in connection with rates on the products of mines, is that of selective mining. Selective mining destroys potential reserves. By selective mining, the higher grade ores and minerals are extracted from the mines, and lower grade deposits are thereby made valueless, in most instances, for all time to come. Increased mining costs, taxes, and freight rates, as well as low market prices and restricted consumption, force selective mining. Freight rates, in particular, are a compelling influence. And the history of mining in such great metal-mining states as Arizona, California, Colorado, Idaho, Nevada and Utah shows that as freight rates from mine to smelter have been increased, selective mining has increased, and that many mines, whose products are of a grade that could not be mined selectively, have had to shut down and remain idle.

Potential tonnage saved for rail haulage ten, twenty, thirty, and even fifty years from now, is of great importance to the carriers, and, in particular, those carriers whose lines thread the extensive arid and mountainous regions of the West. The carriers must have an undiminished flow of revenue traffic. Manufacturers must have raw materials. Labor must have continued employment. And of equal importance, the Federal, state and local governments must have taxation revenue. The effect of rate adjustments upon potential freight traffic should be determined in so far as possible in the present investigation; and wherever the level of rates is found to be responsible for idle mines or for wasteful exploitation of mineral reserves as the result of selective mining, there should be an effort made to conserve this waste by rate reductions.

The Commission was particularly directed by Congress to consider existing depression in agriculture, and to effect with the least practicable delay such lawful changes in the rate structure of the country as will promote the freedom of movement of products of agriculture affected by that depression. In this connection, the fact should not be overlooked that depression in mining has been and is now just as serious as the depression in agriculture, if not more so. It is believed that an investigation will show that depression in the mining industry is, in a measure, responsible for, and preceded, the depression in agriculture. Curtailed mining operations and idle mines in Arizona, Colorado, Utah, Idaho, California, New Mexico, Nevada, Missouri, Oklahoma, and elsewhere, have had a tendency to greatly limit the local markets in the mining districts for products of agriculture. Therefore, any stimulation of the mining industry will tend to relieve agricultural depression.

The Commission is further directed to effect the "lowest possible rates compatible with the maintenance of

adequate transportation service." If the Commission shall find that rate reductions will not result in compensatory increases in the volume of traffic that will absorb the loss in freight revenue by reason of such reductions, so that transportation efficiency will be thereby jeopardized, then it should ascertain whether or not any of the class freights or finished commodities can bear compensatory increases in rates. And it should also ascertain whether or not the stimulation of production and movement of basic raw materials will result in the stimulation of manufacturing, and in an increased movement of fabricated and finished commodities at higher class rates, whereby advantages to the carriers therefrom will be compensatory for reductions in rates on the basic raw materials.

The problem is complex. The task is gigantic. The Commission is confronted with grave responsibilities. The carriers must not be injured. But the basic industries of the country need relief. In invoking the assistance and cooperation of state rate-making authorities, and of all shippers and carriers, the Commission has made a good start. All interests should collaborate with the Commission in seeking the best solution of the most involved undertaking it has ever instituted to the end that the welfare of the whole country, as well as the basic industries and of the carriers, will be served.

### COAL OPERATING PROBLEMS AND CINCINNATI

CHEAPER coal is the crying necessity of the coal industry. The clearest—and in fact under present conditions the only—road to profitable production, lies in the application of every possible economy through the use of improved methods, practice and especially mechanical equipment.

Cutting costs in coal operations is primarily dependent upon the greater and more efficient use of mining machinery. If mechanical loaders can under certain conditions cut the cost per ton one half or one third then their adaptation to other conditions means the salvation of many a coal property. If automatic control of mine equipment means a great reduction in day labor—then such control must be adopted.

"Lower costs per ton or ruin" is the cold hard fact that many operators are up against, and operating men in every district are seeking every bit of practical information and experience to guide them in securing the desired results and thus guide production into the realm of profit.

The discussion of practical operating problems to be held in Cincinnati, Ohio, May 25-29, simultaneously with the National Exposition of Coal Mine Equipment and Machinery, furnishes an opportunity for every operating official to obtain the latest and best information relative to his problems.

The program committee, made up of well known operating men, has arranged for a live, informal discussion of the vital problems of the industry. Some of its features are indicated on another page. This interchange of ideas on operating problems is of great value, and the establishment of this annual meeting of practical operating officials meets a long felt want and is a constructive step forward for the coal mining industry. The meeting at Cincinnati will result in dividends to the operator who attends and takes advantage of this valuable interchange of ideas.

## MINING STANDARDS NOW BEFORE MINING STANDARDIZATION CORRELATING COMMITTEE

*The Standardization Division Of The American Mining Congress Has Submitted A Number Of Reports To The Correlating Committee For Approval As Standard Practice and American Standards—Dr. Holbrook In This Article Outlines The Status Of These Reports, And Other Matters Of Importance To The Industry, Now Before This Committee*

By E. A. HOLBROOK\*

At first sight, making and fixing a standard is a simple matter. For example, in the mining industry, if we wish a standard of any kind, why not get together a group of interested mine operators, engineers and manufacturers, let them agree on a standard and call it a finished work? This procedure is, however, only the first of two distinct steps which are necessary to produce a real national standard. The second step must consist of some form of organization to insure its universal adoption and recognition, not only by the group which drew up the standard but by all groups in the country who may have any interest in the standard.

The mining industry does not stand by itself; its interests are tied on the one hand with manufacturers and producers of every description and on the other hand with consumers of its varied products, with all the engineering professions, with the state and with the general public. For example, in one mining standard proposed it was found that at least 35 national organizations and interests were affected by the standard and thus had a lively and first-hand interest in it. Moreover, mining is but one of many industries and professions that are pushing standardization in their own fields. The results of all their efforts would be chaos were not some clearing-house established. This clearing-house is the American Engineering Standards Committee, with headquarters in New York. This committee, when a standard is offered it for approval, will consider the procedure followed in the formulation of the standard, the adequacy of representation of the various interests and the action taken by the committee having the standard in charge, but will not concern itself with technical details of the standard. They are, then, truly a clearing-house for standards.

And by what orderly procedure does a standard reach them? In 1920 the American Engineering Standards Committee voted, "If it is the desire of any industry to have a general committee, representative of the industry as a whole, as a means of developing and correlating the standardization work of the industry, the arrangement will be satisfactory."

\* Chairman, Mining Standardization Correlating Committee, American Engineering Standards Committee; Dean, College of Mines, State College, Pa.

Thus, following an informal meeting in Chicago of the various national mining organizations interested in standardization, the Mining Correlating Committee was formed to actively develop and correlate mining standards among the industry as a whole. The present member bodies of this committee are the following:

American Mining Congress, United



Dean E. A. Holbrook

States Bureau of Mines, American Institute of Mining and Metallurgical Engineers, National Safety Council, The Associated Companies, American Institute of Electrical Engineers, Mine Inspectors' Institute of America, Coal Mining Institute of America, American Association for Labor Legislation.

The United States Department of Labor and the National Coal Association have been invited to join.

Let us suppose, for example, that one of the member bodies, the American Mining Congress, has worked upon and completed to its satisfaction standards in mine ventilation. It makes application to the American Engineering Standards Committee to have them approved. The American Engineering Standards Committee refers them to the Mining

Correlating Committee. This Correlating Committee appoints the American Mining Congress as sponsor for the project. In some cases where another organization may appear to have an equal interest in the proposed standard it may become a joint sponsor.

The Correlating Committee then suggests a reviewing or sectional committee to work under the leadership of the sponsor. In the makeup of this sectional committee all organizations which may have an interest in the proposed standard are invited to name a representative. Sectional committees are made up of producers, consumers, and general interests. The personnel of the sectional committee is approved by the sponsor and by the American Engineering Standards Committee.

The sponsor is now responsible for the organization and administration of the sectional committee. Presumably, meetings are held in which the proposed standard is reviewed in detail. Objection from any member or members of the sectional committee is given careful consideration in hopes that a compromise acceptable to all may be reached. In case of serious and final disagreement a clause or section may have to be omitted, since it does not represent a true meeting of the minds, a primary object of the work.

Finally, the sectional committee complete their work and prepare a revised report. This is submitted by letter ballot to the members for acceptance or rejection. The final work of the sectional committee is to report to its sponsor. The sponsor then forwards the report of the sectional committee, together with its own recommendations, to the Main Engineering Standards Committee. The sponsor, in submitting the final standard for approval, should furnish the main committee not less than 50 copies of the proposed standard. The main committee then passes on the standard by its regular method of procedure.

Standards may be approved as tentative American standards or as American standards. At a meeting of the Mining Correlating Committee held November 11, 1924, it was unanimously voted that the following policy be recommended to the American Engineering Standards Committee:

*Resolved, Sectional committees on min-*

ing projects, in dealing with reports submitted to them, should review these reports and segregate the specifications, recommendations, etc., into two definite parts, as follows:

(a) Specifications, dimensions, and other concrete recommendations that they may properly be accepted with whatever revision may be necessary as standards suitable for submission to and approval by the A. E. S. C.

(b) Other recommendations contained in the reports which are not in the nature of standards but are of general recommendations for improved practice in the mining industry, should be reviewed, and corrected if necessary, and put into form suitable for publication and recommendation as approved American practice.

Thus, in the mining field a third type of standard may exist. Namely, approved American practice.

#### STATUS OF STANDARDIZATION PROJECTS BEING HANDLED BY THE MINING CORRELATING COMMITTEE

1. Lamps, electric mine, permissible portable. Sponsor, Bureau of Mines. (Owing to important changes in the art, the Bureau wishes to withdraw temporarily all the proposals now before the sectional committee on this project.)

2. Electrical equipment in coal mines, safety rules for installing and using. Sponsors, American Mining Congress and Bureau of Mines. Sectional committee has held several meetings and before final action is awaiting reports of subcommittees on several problems not yet in agreement.

3. Locomotives, storage battery, for use in gaseous mines. Sponsor, Bureau of Mines. In hands of sectional committee.

4. Explosives, permissible specifications for the testing and use of. Sponsor, Bureau of Mines. Approved by American Engineering Standards Committee and published as American standard.

5. Ores, screening of. Sponsor, American Institute of Mining and Metallurgical Engineers. Experimental work completed and report of committee of the American Institute of Mining and Metallurgical Engineers to the Correlating Committee expected shortly.

6. Mine ventilation. Sponsors, American Mining Congress and United States Bureau of Mines. The work of the sectional committee is practically completed and final letter ballots of the committee members are being taken.

7. Underground transportation in coal mines. Sponsor: American Mining Congress. The sectional committee has held two meetings at which good progress was made.

8. Drainage of coal mines. Sponsor,

American Mining Congress. Sectional committee has been appointed.

9. Outside coal handling equipment. Sponsor, American Mining Congress. Owing to the wide scope of this project, three sectional committees have been appointed as follows: (a) Wire rope in mines; (b) construction and maintenance of ladders and stairs for mines; (c) outside coal handling equipment.

#### SAFETY CODES FOR COAL MINES

After unanimous vote of the Correlating Committee it was decided to undertake the formation of standard safety codes for coal mines. The subject was tentatively divided into 12 subcodes. Of these, four were selected for immediate action as follows:

Rock dusting in coal mines. Sponsor, American Institute of Mining and Metallurgical Engineers. The sectional committee appointed have completed the work of preparing the code. This code was presented at the February, 1925, meeting of the American Institute of Mining and Metallurgical Engineers and is in the hands of the sectional committee for final action.

Mine explosives. Sponsor, Mine Inspectors' Institute of America. This organization has accepted sponsorship for the code and will present a preliminary code at their annual meeting at Peoria, Ill., May 19, 1925.

Mine illumination. Sponsor, Bureau of Mines. They have accepted sponsorship and have asked that appointment of a sectional committee be delayed until the Bureau can complete investigational work now under way on the subject.

Mine transportation (safety in). Sponsor, American Mining Congress. The sponsor has asked for and received a list of organizations and personnel out of which to form a sectional committee.

This completes the active projects now under way. In addition to these, the American Mining Congress has asked for consideration and review of the following projects:

Underground transportation in metal mines.

Fire-fighting equipment.

Mechanical loading underground.

Methods of mine sampling.

These projects will be considered by the Correlating Committee during the coming month.

In conclusion, as chairman of the Mining Correlating Committee, I appreciate the faithful and earnest work of the Standardization Division of the American Mining Congress. About one-half of all the mining standardization projects now before the committee have come from them. Standardization is not a task that will be finished tomorrow, but it will expand in proportion with the growth and refinement of the mining industry in America.

#### CARBON-MONOXIDE GAS MASK

THAT the carbon-monoxide gas mask is a useful accessory to crews engaged in fighting mine fires and in rescue and recovery operations following mine fires and explosions is the conclusion drawn from an investigation of the subject made by the Carnegie Institute of Technology and the Department of the Interior in cooperation. Owing to its restricted limitations in irrespirable gases following fires and explosions, the carbon-monoxide gas mask is, however, not a substitute for oxygen-breathing apparatus. In all mines where gas masks are worn there may be danger of entering an atmosphere depleted of its oxygen, against which the gas mask cannot protect, and as a safeguard against such a condition a miner's flame safety lamp should be carried. As long as the flame burns there is no danger of insufficient oxygen to the wearers of gas masks, but when the flames go out they should immediately retreat. As doubt has existed as to what extent, where, and how gas masks should be used, the advisory board of coal mine operators and engineers of western Pennsylvania arranged a cooperative fellowship under joint direction of the Bureau of Mines and Carnegie Institute of Technology at Pittsburgh to determine whether carbon-monoxide gas masks may be used to advantage in fighting mine fires within the limits of safety considered acceptable by the bureau.

The fellow appointed visited eight mine fires of some magnitude, four mine explosions, and several minor fires.

He took part in fire-fighting and recovery operations, obtained and analyzed samples of the mine atmospheres in which work was done, and observed the use made of masks and rescue apparatus.

The laboratory tests of gas masks, details of mine fires and explosions where they were worn, and the results of their use on such occasions are given in Bulletin 14 of the Carnegie Institute of Technology, written by S. H. Katz, G. S. McCaa, and A. L. Barth. Copies of Bulletin 14 may be obtained from the Carnegie Institute of Technology, Pittsburgh, Pa., or from the Department of the Interior, Bureau of Mines, Washington, D. C.

#### MAGNESITE TARIFF

THE United States Tariff Commission will continue the investigation heretofore instituted for the purposes of Section 315 of the Tariff Act of 1922, with respect to magnesite.

The Commission will confine the investigation to consideration of differences in costs of production of crude and caustic calcined magnesite in the United States and in competing countries.

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*In the vaunted works of Art  
The master-stroke is Nature's part.*

# THE NATIONAL STANDARDIZATION MOVEMENT AND THE MINING INDUSTRY

*Industrial Standardization Has Grown Amazingly During Recent Years, Until There Are National Organizations In Nineteen Countries Carrying On Standardization Projects—The Mining Industry Is A Leader In This Movement, As Is Shown By Dr. Agnew*

By P. G. AGNEW\*

INDUSTRIAL standardization continues to develop steadily in all of the industrial countries of the world. It is significant that in 19 countries there are national organizations which are carrying on standardization activities on an inter-industry or national scale.

It is an interesting fact, in this connection, that a standardization movement is developing in Latin-American countries, as is evidenced by the recent Pan American Conference on Standardization held in Lima, Peru. The idea of this undertaking originated in South America. While the conference did not undertake any technical work, the basis was laid for a broad cooperative movement throughout the American republics.

The vigorous development of the movement in this country is evidenced by the lengthening list of standardization projects before the American Engineering Standards Committee. These now include 33 projects in the civil engineering and building trades group, 26 in mechanical engineering, 15 in electrical engineering, 4 with automotive subjects, 11 with transport, 1 with ships and their machinery, 14 with ferrous metallurgy, 15 with nonferrous metallurgy, 12 with chemical subjects, 3 with textiles, 16 with mining, 5 with the wood industry, 1 with the paper and pulp industry, and 12 projects with topics of a miscellaneous or general character.

In all, 67 standards have been approved, and a hundred others are under way. About 250 national industrial groups are cooperating through accredited representatives of technical, and trade associations, and government departments. Each project is in the hands of a joint technical committee termed a sectional committee, upon which all interested groups are represented through their associations. Ordinarily a sectional committee contains from 20 to 30 men representing a dozen or 15 organizations, but in some cases as many as 35 national organizations are represented on a single committee. Each of these committees works under the leadership of one or more of the organizations principally interested. Such an organization is termed a "sponsor." The sponsor organizes the sectional committee and is responsible for seeing that the work is continuously and effectively

prosecuted and that the necessary administrative and clerical services are provided. The sponsor provides also for the publication of the standard. The relation of the sponsor to the other cooperating bodies represented on the sectional committees is somewhat similar to the relation of the chairman to the other members of a committee.

It may be asked, why is any such machinery for inter-industry cooperation necessary? Why should each organization not do the standardization work for its own group entirely by itself?

So complex and interrelated has modern industry become that there is scarcely an important problem that does not touch in a very definite way the interests of a dozen industrial groups. Questions like bolts, nuts, gages, gears, or specifications for pipe, or cement, or steels, are of first importance in a large number of industries. Even in the case of so specialized a subject as specifications for railroad ties, a dozen organizations are represented on the sectional committee. The American Mining Congress, for example, has a very direct interest in the subject of ties, for specifications for ties for use in mines must be properly correlated with the larger subject of specifications for ties for steam and electric railways, if there is to be the greatest possible economy in the use of materials.

If all of the industries interested in the production, distribution and use of a product properly unify their requirements, it is, in general, reflected in lower prices, better deliveries, and better material than would be possible without such cooperation.

## MINING STANDARDIZATION PROJECTS

Until comparatively recently little has been accomplished in the way of standardization in the mining industry. The pioneer work in this field has been done by the United States Bureau of Mines, which was first in the field, and by the American Mining Congress. The following 16 projects are now actively under way, under the procedure of the American Engineering Standards Committee:

Permissible Portable Electric Mine Lamps. Sponsor, Bureau of Mines.

Safety Rules for Installing and Using Electric Equipment in Coal Mines. Sponsors, American Mining Congress and Bureau of Mines.

Storage Battery Locomotives for Use in Gaseous Mines. Sponsor, Bureau of Mines.

Specifications for Testing and Use of Permissible Explosives. Sponsor, Bureau of Mines.

Screening of Ores. Sponsor, American Institute of Mining and Met. Engineers.

Drainage of Coal Mines. Sponsor, American Mining Congress.

Underground Transportation in Coal Mines. Sponsor, American Mining Congress.

Ventilation in Coal Mines. Sponsors, American Mining Congress and Bureau of Mines.

Ventilation in Metal Mines. Sponsors, American Mining Congress and Bureau of Mines.

Outside Coal Handling Equipment. Sponsor, American Mining Congress.

Wire Rope for Mines. Sponsor, American Mining Congress.

Ladders and Stairs for Mines. Sponsor, American Mining Congress.

Rock Dusting, Safety Code for. Sponsor, American Institute of Mining and Met. Engineers.

Safety Code for Mine Explosives. Sponsor, Mine Inspectors' Institute.

Safety Code for Coal Mine Transportation. Sponsor, American Mining Congress.

Safety Code for Coal Mine Illumination. Sponsor, Bureau of Mines.

Through the sectional committee method the work of the many bodies interested in these subjects is being broadened and unified into a consistent set of national industrial standards. For instance, a considerable part of the work is based upon reports of committees of the American Mining Congress. A part of this material is being developed into definite clear-cut standards satisfactory to the various organizations concerned, while other parts which cannot yet be so clearly defined are being developed into recommended practices for trial and development in the mining industry.

Until recently, the larger number of such projects were directed primarily to economic ends, but the last four projects initiated have to do primarily with safety. These are the codes for rock

\* Secretary American Engineering Standards Committee.

dusting, mine explosives, coal mine transportation, and mine illumination. They were decided upon after a study of the general subject extending over more than a year. Some engineers had recommended the formulation of a "model basic coal mining law." But after a thorough investigation of the subject it was unanimously agreed that while such an ambitious undertaking was undesirable, there was a real need for a few simple codes as guides to the mining industry, and which would also serve as guides in pending legislation.

To assist in keeping the work in the different sectional committees properly correlated, there has been organized the Mining Standardization Correlating Committee. This committee acts in an advisory capacity, suggests subjects for standardization and, through direct contact with the organizations represented on it, determines the desirability of undertaking work on proposed subjects, recommends sponsors, defines and limits the scope of projects, assists in adjusting conflicts or clearing up ambiguities, follows up and expedites work in progress in the development of standards, and reports from time to time upon progress made within their field of activities. The Correlating Committee contains representatives of all of the national organizations in this country interested in the range of its activities.

As has already been indicated, the American Mining Congress is playing an important role in all of the mining work which is going forward under the procedure of the American Engineering Standards Committee. In addition to the projects already enumerated for which it is acting as sponsor, it is officially represented on nine other sectional committees, and upon the Correlating Committee. Steps are now being taken to arrange for its direct representation on the American Engineering Standards Committee itself.

#### ADVANTAGES TO THE COMPANY FROM THE NATIONAL MOVEMENT

As has often been pointed out, the first stage in industrial standardization in this country, namely, standardization within the factory, was primarily a development of the latter half of the nineteenth century. It led to America's foremost position in mass production. Standardization by industrial groups, through technical societies and trade associations, is largely a development of the present century, while interindustry or true national standardization is a recent development, primarily during and since the war. Through the American Engineering Standards Committee the national standardization movement has now taken definite form and direction, the methods and procedure have been thoroughly tried out during more than

five years of active work, and a substantial amount of work has been accomplished.

Among the benefits which a company derives from aligning its work closely with the national standardization movement are: It broadens and regularizes sources of supplies; it broadens the market for manufactured products; it stabilizes business by making it safe for the manufacturer to accumulate stock during periods of slack orders to an extent which would not be safe with an unstandardized product; and products complying with national standards are given a large amount of free advertising through an extensive discussion among organizations, and in the technical and trade press, during the period of the formulation of the standards.

While a company may gain many advantages from following the nationally approved standards in a general way, it is only by an intensive and detailed study of many problems that arise in the complete introduction of standards into practice that a company can gain the most possible from the movement.

Increasing competition is bound to result in some form of definite organization for the work, instead of leaving it as a more or less incidental part of their engineering and production activities, in the majority of all but the smallest companies. This has already taken place in Continental Europe, particularly in Germany, Austria, Switzerland and Czechoslovakia. More than 1,000 firms in Germany have such organizations, some of the larger companies having as many as 100 or even 200 members of their staff devoting full time to such activities. The increase in the number of companies affiliated as sustaining members of the American Engineering Standards Committee is a notable step in this direction.

It is worth while to mention a few "American standards" which should be in use in the average mining company: Specifications for cement; specifications for drain tile, code for lighting factories

and mills; methods of testing concrete and materials for concrete; standard screw thread for bolts and nuts, and for pipe, and for fire hose couplings; safety code for mechanical power transmission apparatus; specifications for steel and wrought iron pipe; for carbon-steel and alloy-steel forgings; for bars and plates; for copper and copper wire; for non-ferrous alloys, such as brass sheet and ingot metal, bronze, and gun metal; and methods of sampling coal.

## EXPLOSIVES AID PLACER MINING IN ALASKA

By H. E. DAVIS\*

THE placer mines of Alaska find one of their chief difficulties in the fact that the gold bearing gravel is frozen. Before it can be handled with pick and shovel it must usually be thawed by steam. Although explosives are regularly used at the open cut operations for blasting the frozen overburden and the boulders, blasting the pay gravel has not as a rule, shown much advantage because most of this material contains so much ice that it must be thawed before it can be sluiced. The customary method of working the pay gravel is to drill it, insert steam pipes in the drill holes and thaw the material until it can be picked down.

During the past year, however, the Idaho Mining Company on the Little Eldorado Creek in the Fairbanks district has successfully introduced blasting. This is a drift mine where an average of 2 feet of gravel and 2½ feet of schist bed rock is mined at a depth of about 165 feet. The gravel is tightly packed and does not contain more than 5 percent of ice, this occurring in small crystals. Cut holes are drilled in the bed rock with jackhammer drills 2½ feet apart and lifters are drilled 3 feet apart. Back holes are drilled in the gravel spaced 3 feet apart. The holes are loaded with 40 percent dynamite, about four and one-half cartridges to the hole, and fired with cap and fuse. The blasting shatters the material so that it readily disintegrates in the sluices. The mixture of gravel, schist and ice is scraped into the cars by a slush scraper, carried in them to the shaft, dumped into a self-dumping bucket, hoisted to the surface, conveyed over an inclined cable, dumped at the head of the sluices and successfully sluiced without any steam thawing being necessary. Dispensing with the thawing and picking processes formerly in use greatly facilitates the mining of this deposit. The total cost of explosives per cubic foot of area mined is about 60 cents.

\* DuPont Powder Co.

#### An Error

Through an error proper credit was not given to the Anthracite Bureau of Information and E. W. Parker, Director, for the article in the February issue of the Mining Congress Journal, entitled, "The Anthracite Industry in 1924."

The review of iron ore production in 1924, in this same issue, should have been credited directly to the United States Geological Survey.

—Editor.

# STANDARDIZATION OF MINE TRACKS AND SIGNALS

*The Writer Believes That Standardization Will Put A Stop To Unnecessary Expense In Mine Operation And This Article Outlines How Underground Transportation Equipment May Be Standardized And Its Cost Reduced*

By CHAS. H. PARTINGTON\*

STANDARDIZATION, as a general thing in the mining field, was launched several years ago, and, while not as yet a completed work, it stands out boldly as one of the greatest advances in the history of the industry. While many things have been accomplished to date, there are phases of the subject still waiting to be handled. Due to the fact that the equipment used in mining embraces such a variety of products, the work of standardization must be carried on by carefully selected divisions.

The division concerned with underground transportation is a vital one as it involves mine locomotives, mine cars and also tracks and signals. The latter section will be discussed in this article with the idea to impress the reader to the greatest extent upon the importance of standardization in this part of coal mining equipment.

Until the past few years the subject of mine tracks was given little consideration generally, although in some few cases certain operations gave thought to the subject and were specific in their demands for equipment. To most users, track was simply track and given the least consideration, where in reality it should receive the same as any other equipment. It is sincerely hoped that standardization will bring home to the mine operator the importance of this foundation of haulage as it means a great deal toward lower production costs in the coal industry.

The committee now working on the standardization of mine tracks has passed through several years of hard work and the experience gained has proven very valuable toward the recommendation and adoption of standards which will mean so much to the mine operator. While it is true that practically all manufacturers have had standards of their own, it is also true that no two were alike. In cases where frogs and switches were purchased from the same manufacturer at all times or where the mine had standards of its own, little or no trouble was encountered. Should the mine be equipped with frogs, switches, etc., purchased from various sources and to no definite specifications, nothing but trouble and delay could be expected wherever replacement was concerned.

Coupled with the above is the draw-

back of the material itself. Frogs and switches can be purchased to suit the pocketbook just the same as any other merchandise. Even if the pocketbook is not considered, the method of ordering a frog without thought as to its use and service is very likely to result in trouble. Cheap first cost of track material or cheap, haphazard installation or both, is false economy in the fullest sense of the word and the sooner this fact is realized the more will be the saving in the cost of producing coal.

Derailments of mine locomotives and cars are very expensive. Far more so than most operators believe, and these costly delays in many cases are caused by poorly installed or poorly constructed track and equipment.

Standardization will put a stop to most of this unnecessary expense in mine operation and while it is not possible to detail all the advantages to be derived, the most important phases can be mentioned, as follows:

The matter of frogs, switches, guard rails, etc., can, and are, being definitely settled. Definite frog angles will eliminate the odd ones now prevalent which do no good and should be discarded as there is no reason for ever having adopted them. Odd angles mean special construction and consequently a higher cost as well as retarded delivery. With the establishment of definite recognized standard angles, the committee has also fixed the lengths of frogs, not only as to the total dimension, but in regard to the toe and heel distances. This fact will make the matter of replacement very simple, regardless of the source from which the frog was secured.

Establishing definite angles and lengths is quite an item in the work of standardization but advantages will not stop at these points. The lengths established will be such as to conform to the angle and size of rail to allow free use of angle bars and fishplates without interference. Short frogs so much in use as a supposed economy from the standpoint of the less rail, the less cost, really are more expensive than a long frog as the interference of angle bars or bolts make it necessary to spend time and money to remove part of the offending connections. Cutting down the length may establish less rail and lower the cost of the frog itself, but the rail omitted must then be in the track and in

reality no saving of material is effected. The only thing accomplished is added labor of fitting joints when the installation is made.

Frog angles only do not establish the lead and radius of a turnout as most track workers believe. The toe distance, switch length and switch angle are also controlling factors and very important ones at that. Consequently the matter of the switches themselves must be given thorough consideration.

Standardization as applied to switches must first be centered on lengths and angles as most suitable for the various frogs, as well as the rolling equipment that passes over them. Weight of cars and motors, size of wheels, wheel base, mine clearance, etc., all have a bearing on the matter. The establishment of switches to conform to operating conditions will prevent to a great extent, the haulage delays due to not giving this part of the track its proper consideration.

Added to the factor of correct lengths and angles will be the details of design. All controlling dimensions, not only of the switch points, but of the accessories, will be definite. Replacement of any part of the switch can be accomplished quickly by using standard parts. Such things as re-drilling a switch point or bridle bar to suit odd lugs, or wedging a lug jaw because it is too small for the bar are only a few of the costly points of haphazard replacement to be eliminated by the adoption of standards.

Having definite angles and dimensions for frogs and switches means certain fixed leads (distance from point of switch to point of frog) and correct radii. The lead and radius of each turnout formed by the various combinations of frogs and switches will be established without question, thereby giving the trackman, by means of plans, a definite and correct method of installing turnouts.

The matter of turnouts holds the lead as regards the standardization of mine tracks and is all that will be discussed in this article. Other equipment and signals will receive careful attention so that the mining industry will be assured of standards capable of offering the most benefits. The application of these standards to actual operations will soon prove of value and it is sincerely hoped that the mining industry will adopt the plans and methods worked out for the mutual good of all concerned.

\* Chief Engineer, Cincinnati Frog and Switch Company.

## MINE FAN INSTALLATION

*There Are No Ventilating Problems Encountered In Any Phase Of Engineering That Compare In Difficulty With Those That Are Being Met And Solved Almost Daily By Mining Men. Mr. Lyman, In This Article Tells How To Meet Them*

By G. E. LYMAN\*

THE modern coal mine with its many miles of main haulage tracks, its extensive gathering haulage system, its widespread area of active workings, its underground shops and offices, power substations and pumping plants, together with its power distribution, light and telephone systems, makes of it in truth a veritable underground city in which a population of one thousand or more active workers is not at all uncommon. Consider further that all the work of this great producing organization is carried on within the narrow confines of underground passageways and working places from which noxious, and often dangerously destructive explosive gases are constantly being given off, and it will more readily be appreciated how completely its proper functioning is dependent upon every part receiving continuously an ample supply of fresh air.

Little thought is ordinarily given to the mere mechanical work that is per-

The first step toward proper installation of any ventilating unit is to ascertain as nearly as possible the work to be performed. In the case of a mine already developed two little instruments, the anemometer and water gauge, will indicate precisely the characteristics of the mine to be ventilated. In the case of a new operation, where a fan is to be installed to serve through the estimated life thereof, the volume required, the water gauge necessary to produce it, and the best arrangement of air courses to convey it are matters for careful computation, to be further well tempered by practical knowledge and experience as to ventilation requirements and possibilities in that particular seam.

The first step is to determine the volume ultimately required. Most states require by law a certain definite amount per man, and a further much larger

amount per animal, underground. These legal requirements represent the minimum volume that may be used, but the experienced engineer will add an extremely liberal allowance for the losses that are inevitable before the working faces are reached, as well as to provide a liberal factor of safety for all possible contingencies. It is very safe to say that a fan should be able to easily deliver at least twice the volume required by law for the maximum number of men and animals that will ever be underground at any one time.

With the proper volume determined, the next step is to ascertain the water gauge necessary to force it through the workings. Here again, in the case of a going operation, the problem is simple. It is merely a matter of comparing the present volume and water gauge with the desired volume, according to the well known physical laws governing the flow of air currents. Due consideration of these simple facts would often prevent disappointment over failure to obtain the anticipated results from an expensive fan installation. If, for instance, a mine ventilated with 50,000 cubic feet of air per minute at a water gauge of two inches, finds it necessary, on account of employment of additional men, encountering gas, or otherwise, to use 100,000 cubic feet, it can only be put through the mine (underground conditions remaining unchanged) by increasing the water gauge to eight inches. This is clearly prohibitive from the standpoint of power consumption, as well as efficient maintenance of doors and stoppings below, and further investigation would probably demonstrate



formed by a high capacity fan, but as a matter of fact it frequently exceeds that of the hoisting engines. A mine producing 4,000 tons of coal daily will, in the same time, have forced through it by the fan about 8,100 tons of air, if ventilation is maintained continuously at the rate of 150,000 cubic feet per minute throughout the 24-hour period. The proper selection and installation of equipment to perform this heavy and continuous duty is therefore of the greatest importance, and it may be truthfully said that there are no ventilating problems encountered in any phase of engineering that compare in difficulty with those that are being met and solved almost daily by mining men.



Two views of the 14' x 5' Jeffrey fan of the Madison Coal Corporation at Cambria, Ill. This has twin engine drive and connects to air shaft with a concrete tunnel. Note in the lower picture the air lock doors each side of fan casing

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Two plants of the Madison Coal Corporation. Above, general view, including fan building, at Divernon, Illinois. Left, tipple, power house and shop buildings at Mine No. 12, Cambria, Illinois.

that work on air courses, rather than a new fan installation, is needed, providing of course the present fan has capacity for the requisite volume.

In the case of an undeveloped mine the determination of the required water gauge is uncertain in many ways. Theoretically it could be calculated, but due to the fact that no exact coefficient of resistance can be applied to any mine, the most painstaking and laborious calculation will generally be considerably wide of the mark. The writer, although one of those sometimes referred to as "technical men," and will full appreciation of the application of scientific methods, is free to confess that in his own experience he has yet to find anything in this respect that will equal the application of sound common sense, based on intimate practical experience with mine ventilation in the district in which the new installation is to be made. It has been his experience, and observation, that the practical method is to arbitrarily fix the maximum pressure at which mine is to be ventilated, and then lay out the projected workings, and maintain the air courses in such condition that it will not be exceeded. The writer's experience, based on ventilation of many mines under widely varying conditions, and with water gauges as high as six inches, has convinced him that anything over three inches is tremendously expensive from point of power consumption, and maintenance of the stoppings, doors and overcasts underground. When a higher pressure is needed to put the required volume through the mine, relief should be secured by reducing the mine resistance.

With the volume of water gauge of the prospective fan decided, the next point is whether it shall be, primarily, a blowing or exhausting installation. Custom varies among the different mining districts in this re-

spect, but there are certain well known characteristics of each type that should make this point comparatively easy to decide.

The principal advantages of the blowing system, briefly, are:

First. The haulage ways and hoisting shaft, being the return, are of uniform temperature throughout the year, and free from ice and freezing temperatures in winter.

Second. The intake air can be artificially humidified much more readily than with the exhaust system.

Third. The air reaches the face workings with the minimum contamination from the dust of the haulage ways.

Fourth. A fire in any part of the mine is quickly made evident to the men working on the return from the section.

The main advantages of the exhaust system are:

First. Gases and dust are kept off the main haulage and traveling ways, making an exhaust fan particularly adapted to gaseous seams.

Second. The mine is ventilated under lower than atmospheric pressure, so that if the fan stops the tendency is for the gas to be driven back into the gob and old workings.

The gaseous, or nongaseous, characteristics of the seam usually decide the choice between the two systems.

Regardless of whether the blowing or exhaust type is selected, the installation should be so made as to admit of easily

reversing the flow of the air current through the mine. However, the fan should be built primarily for the main duty, it is to perform, and its possible operation otherwise should be considered merely incidental. It is true that a fan can be built which will work equally as efficiently blowing as exhausting, but in order to do this it is necessary to sacrifice a little efficiency each way; however, where the highest efficiency point in the curve is desired, it is absolutely necessary to build the fan primarily for the main duty.

The double inlet fan, with its lower intake velocity as compared with the single inlet type, is to be preferred unless local conditions make its installation impracticable. Good design requires that the pressure due to the velocity into the inlet of the fan shall not exceed  $7\frac{1}{2}$  percent of the water gauge against which the fan is working.

Next to be considered is the size of fan desired, and this in large measure determines the speed of operation. It is just as easy to get a fan too large as it is too small, and the proper course is to select a size that will operate efficiently at the average duty, and at the same time have sufficient reserve capacity to meet unexpected demands for additional volume and pressure, which performance will, of course, be given at a lower rate of efficiency. Economy in original cost of the equipment and its installation favors the small, high-speed fan; on the

other hand, the larger and lower-speed fan, though a more costly installation, has compensating features in the way of reliability of operation and infrequent need of attention that are of decided value. Increased volume and pressure, when needed, can also be more readily and economically obtained from the larger fan. Installation of an outfit much too large, however, means that the operator has a fan of much lower



Primary Blowing, Reversible 16' x 5' Jeffrey Fan, Madison Coal Corporation, Divernon, Illinois. The fan is connected to the air shaft by a concrete tunnel

mechanical efficiency than if the correct size had been selected, for the operation of which he will consequently pay much more in power bills, to say nothing of the additional first cost. On the other hand, the fan that is too small for a specified duty is equally wasteful, for there is nothing more inefficient mechanically than a fan working far above its normal capacity. Wonderful claims are frequently made for the great volume of air that a very small (and consequently low-priced) fan will deliver, but when giving such performance it is only its volumetric capacity that is worthy of note. The mechanical efficiency, on which power bills are based, can easily be only half that of a larger fan properly designed for the same duty. With the present efficient designs and manufacturing methods, the operator cannot go far wrong by specifying the volume and water gauge desired, and leaving it to the manufacturer to recommend the most efficient size.

Maximum efficiency being so entirely dependent on the use of a fan properly designed and proportioned for any given duty, it is evident that where the ventilation demands are constantly increasing with the age of the mine, there is a considerable sacrifice of operating economy by installing at the start a fan large enough to meet the maximum requirements several years later. It is quite conceivable, as claimed by many engineers, that the actual saving in power bills that would result from installation of a small fan at first would more than pay for the installation of a larger fan several years later when the ventilation requirements are approaching their maximum.

The type of drive to be selected depends much on local conditions, the kind of power used for the mine plant, size of the fan, etc. Large fans, operating at comparatively low speed, offer ideal conditions for direct connection to a steam engine of efficient type. The continuous operation of the unit thoroughly justifies the additional cost of an engine of the four-valve or Corliss type, with its low steam consumption. The economy with which such an engine may be operated at widely varying speeds is of particular importance in the case of a new mine, where the power requirements are constantly increasing as development proceeds.

Where steam drive is used the steam line should be well insulated, provided with expansion joints, and equipped with a reliable trap to eliminate the water of condensation.

Where electrical power is used the drive may be a belt, rope or chain. The silent chain type of drive is very efficient, permits the use of very close centers, thereby reducing size and cost of buildings, and is perhaps the most satis-

factory for all-around requirements. Where belt drive is employed the distance between centers should not be less than three times the sum of the pulley diameters.

The type of motor to be used is generally governed by the kind of current available at the mine, whether power is purchased or generated at the plant, and other local conditions. Where direct current is being generated 24 hours per day for general purposes, the direct current, compound wound, commutating pole, variable speed motor really offers the most economical drive. Speed control within a wide range can be economically obtained by means of a field rheostat so that maximum and minimum requirements for working and idle periods can be readily handled. The practice of operating direct current motors with armature circuit control is very wasteful and should never be resorted to. It would, in fact, be more economical to change the diameter of the driving pulley or sprocket if lower speed were required for any length of time.

Where alternating current is used there are a number of motors having different characteristics from which selection may be made to meet individual requirements:

First. Where speed variation is not required the squirrel cage induction motor, which is made in a number of sizes with standard speeds of 585, 700, 860, 1,150 and 1,750 revolutions per minute, may be used. This type of motor is largely used for driving the small sizes of fans. Its efficiency ranges from 87.5 percent at full load to 75 percent at half load.

Second. Where variable speed is required the slip ring, wound-rotor, variable speed type of induction motor may be used, the speed being regulated by inserting external resistance in the rotor windings through a drum controller. Its efficiency ranges from 87.5 percent at full speed to about 38 percent at half speed, and this loss of efficiency at reduced speed makes it an expensive proposition when run for any length of time under such conditions.

Third. The constant speed synchronous motor is frequently used on large installations, being direct connected to the fan shaft by a magnetic coupling. In starting the motor is first brought up to synchronous speed, after which the fan is brought up to motor speed by the magnetic clutch. This type of motor permits of very low speeds, but must of necessity be operated constantly at the speed for which it is designed. Its efficiency ranges from 89 percent at full load to about 85 percent at half load.

Fourth. Where conditions permit running the fan at half speed at night and on idle days, a great saving can be made

by installing a two-speed induction motor. This will permit the speed to be reduced one-half by using pole-changing equipment, for regrouping the windings for whichever speed is required. This arrangement permits of very high efficiency.

Where electric motor drive is employed an automatic starter should be used, so that ventilation will only be momentarily interrupted if its circuit breaker goes out. It should be connected behind the main circuit breakers that control the underground circuits, so as not to be subject to every interruption of underground service.

Wherever possible an auxiliary drive should be provided for emergencies, operating if possible from a different source of power. Where steam drive is regularly employed, and electric power is available, as is generally the case, an electric motor makes a good auxiliary. When the entire plant is operated with electric power, and steam is not available, an oil engine of the Diesel, or semi-Diesel, type will afford reliable and cheap power in emergencies. It could advantageously be installed in the form of an oil engine-generator unit, which can be wired to the main switchboard, so that in case of failure of the regular source of power it can be started and used to operate the fan with no more trouble than that involved in throwing a few switches. In this way the use of couplings, clutches, etc., on the fan shaft is avoided.

Whenever possible the fan shaft should be continuous through its entire length, and free from couplings and clutches. Its continuous service, frequently under very heavy duty, makes simplicity in this respect a big factor toward satisfactory operation. Even where duplicate driving units are provided for the fan, the shaft can readily be made in one piece if so designed originally. With belt or chain drive it is a simple matter, calling only for duplicate pulleys or sprockets on the shaft, and involving nothing more than shifting the belt or chain when making the change. The writer once installed a large fan with duplicate steam engine drive, one on each end of the main shaft, which was solid throughout its entire length. The fan may be operated by either engine alone, or by both together, with equal facility. Change from one to the other is readily made by disconnecting at the crank pin. This installation has given the utmost satisfaction through 14 years' continuous service.

Where steam engines are used a sensitive governor should be employed for the purpose of maintaining constant speed as the steam pressure varies. In the case of the twin-engine installation, above referred to, one governor is arranged so as to control either engine

independently, or both together, as circumstances require.

Provision should be made for the very best bearings for the fan shaft that can be made. Heavy, bronze-lined, ring-oiling, self-aligning, heavy-duty bearings, although expensive in first cost, are economical in the reliable service they render. Felt packing to keep out the dust, and generously proportioned oil reservoirs, should be prime requisites.

In making the actual installation two considerations are paramount:

First. Fireproof construction throughout.

Second. Permanency and durability.

Absolutely fireproof construction is readily obtained. In most cases the fan housing, doors, side drifts, and frequently the connecting drift to the air shaft, are furnished complete of steel construction by the manufacturer. The engine, or motor house, can be of brick or concrete, with concrete or tile roof. Some companies make the fan housing itself of concrete, but it is doubtful whether this gives any real advantage over steel construction either from the standpoint of durability or economy. Concrete floors should, of course, be used.

If there is any one point in which expense should not be spared, it is that of providing ample foundations. This is of particular importance where the drive is by direct connection to a steam engine or large electric motor. The slightest settlement will throw the equipment out of line and give rise to operating troubles that will be as persistent as they are annoying and expensive.

The method of installing the fan in relation to the air shaft deserves careful consideration. It should be set back from the shaft far enough to be well out of line of any explosion that may occur, and to admit of installation of explosion doors practically over the shaft itself. Where the fan is located near the main buildings, and the top plant itself is laid out along a well-defined building line, it can be lined up with the other buildings and connected with the air shaft by a tunnel, the top of which is only slightly above the grade of the mine yard. This requires an underthrow fan, and while a somewhat expensive installation, has much to recommend it in the way of conforming to general building lines, placing the equipment a safe distance back from the shaft and proper location of explosion doors. In the case of drift or slope mines the same relative effect can be obtained by locating the fan at more or less of an angle with the opening, so as to permit a connecting steel drift with an easy curve to be used, the explosion doors to be located directly in line with the opening.

Many excellent installations use the overthrow arrangement of delivery and connect with the air shaft by means of a steel drift above the surface of the ground. In some cases the fan opening fits immediately over the shaft, but in so doing material sacrifices in the way of safety from explosions and fires in the shaft are made. The overthrow type, in general, permits of cheaper installation than the underthrow, as the steel drift is, as a rule, less costly than the concrete tunnel required with the latter type.

The reversing doors should be of steel, rigidly reinforced for stiffness, and hung so as to swing freely and fit accurately. Reversal is, as a rule, rarely needed, but sometimes hundreds of lives may depend on it being quickly done, and it is then too late to struggle with doors that will not fit properly and swing easily.

A desirable and comparatively inexpensive feature is an air lock on each side that will facilitate access to the side drifts for oiling and inspection when the fan is exhausting from the mine.

The fan is frequently located at a considerable distance from the main plant, where it receives attention at infrequent intervals. In such cases thermostats installed on the bearings of fan and driving equipment, and connected by wire with an alarm at the mine plant, will give prompt warning if any bearing begins to get overheated. For the same reason lubrication should be entirely automatic for both fan and driving equipment.

A recording water gauge should be installed so as to give an accurate record of the ventilating pressure maintained throughout the 24-hour period. An ordinary water gauge installed beside it is of service for occasionally checking the accuracy of the recording gauge. These two instruments can be installed in the motor or engine room, and connected by pipe to the fan tunnel or drift beyond the point of discharge of the fan. The opening of the pipe into the tunnel should be protected from the direct velocity of the air current so as to truly indicate the static pressure.

As a matter of safety all openings into the fan intakes should be securely fenced so as to prevent children or animals from getting into same. Adequate guards should be installed to insure safety when lubricating.

Many old mines of fairly large capacity are today being ventilated with wood-housed fans that are veritable fire traps. While impossible to fireproof them without complete rebuilding, they can be made fire resisting by covering with corrugated iron on the outside and lining with plaster or stucco work on the inside. Sometimes gunnite is used over an old wooden fan building to excellent advantage, and the fire hazard, while not completely eliminated, at least greatly reduced.

Further protection for such structures can be given by installation of sprinklers of the well-known type that release automatically when a certain temperature is reached. Another worth-while precaution is the installation of a perforated pipe sprinkler system that can be kept drained during freezing weather and brought into action instantly when needed by opening control valves outside the building. The installation that in itself is completely fireproof, however, is the only one in which any degree of confidence may be placed by men and management alike.

Ten local land offices located in various sections of the country were recently abolished, effective April 30. Action by the Secretary of the Interior was taken under an act of Congress providing for the discontinuance of local land offices where the amount of public land under their control is less than 100,000 acres and their cost of operation exceeds 33½ percent of their earnings. In the case of these local land offices permanently closed it was found that the amount of public land under their jurisdiction had decreased below this figure and the earnings had fallen off to such an extent that the cost exceeded them by over 33½ percent.

The names of the offices discontinued and the offices taking over their public land, records, and archives follow, by states:

Abolished offices: Arkansas, Harrison; California, Eureka; Colorado, Lamar, Sterling; Idaho, Lewiston; Minnesota, Duluth; Montana, Kalispell; Nebraska, Lincoln; New Mexico, Clayton; South Dakota, Belle-fourche. These offices have been consolidated with the offices at Little Rock, Sacramento, Pueblo, Denver, Coeur d'Alene, Cass Lake, Great Falls, Alliance, Santa Fe, and Pierre.



Homes for Mine Foremen at Mine No. 9 of the Madison Coal Corporation, Cambria, Illinois.

# MINE LOCOMOTIVES FOR THIN AND THICK COAL VEINS

*Four Feet Vein Thickness Apparently Is The Line Of Demarcation Between Small And Large Gathering Locomotives—Trip Locomotives Should Weigh Ten Tons Or Be Used In Tandem Units—Suitable Equipment For Varying Conditions*

## GATHERING LOCOMOTIVES

**G**ATHERING locomotives might be standardized into two sizes: (A) A low, small size for coal 48 inches and under. (B) A larger size for coal over 48 inches.

### A

(1) Size (1) or low coal locomotive:  
Weight, 4 tons.  
Volts, 250.  
Motors, 2.  
Horsepower of motors, 24 each.  
Control, single end.  
Wheels, outside.  
Rated, D. B. pull 2,000 pounds.  
Starting D. B. pull, 2,400/3,000 pounds.  
Approximate full load in M. P. H., 6.  
Track gauge, standard mine gauge, 44 inches.

Overall width, 54 inches.  
Length overall, approximate, 13 feet.  
Height of frame above rail with trolley pole locked down, 28 inches.

Approximate minimum height above rail to trolley wire on which trolley wheel will operate, 36 inches.

Wheel base, 40 inches.  
Diameter of wheels, 22 inches.  
Diameter of axles, 3½ inches.  
Frame, of structural steel.

(2) Buffers and draw bars: To suit standard cars. The end channels to be fitted with wood, faced with heavy steel protection plates without projecting lugs.

(3) Driving wheels and axles: Driving wheels to be cast iron with steel tires, having 4-inch tread and standard contour flange. This flange wears better and gives better braking surface. They shall be pressed on and keyed to open hearth steel axles which shall be finished all over and without shoulders.

(4) Journal boxes: Railway type with removable linings lubricated from oil cellars filled with waste. Linings should be of a composition metal that will not break—the end of the linings in Jeffrey journals frequently break up and drop in oil cellar—but will not ruin the axle if permitted to run dry for a short time which brass linings do. The weight of the locomotive will be supported from the journal boxes on heavy, semi-elliptic equalized springs.

By T. F. DOWNING, JR.\*

(5) Brake: Automatic locking screw and levers so proportioned that braking effect sufficient to lock the wheels can be readily obtained. Shoes to be simple one-piece castings, readily removable and adjustable. Wearing parts of brake rigging such as screw and yoke to be as simple and inexpensive as possible.

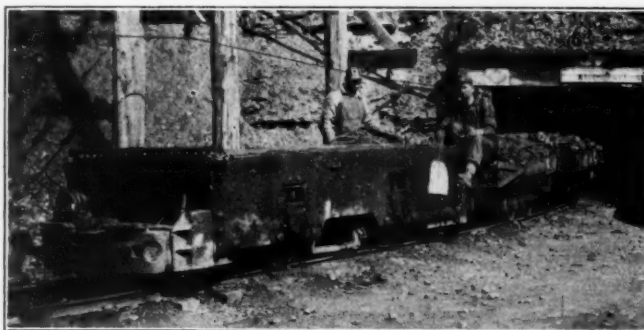
(6) Sanding device: Four sand boxes fitted with positive-acting self-closing valves. Valves will be arranged to operate in pairs with the lever handles located within convenient reach of the motorman. Rubber hose sand spouts provided to direct sand on rails. Sand levers and rods to be above the bottom level of frame so that they will not be broken every time the locomotive jumps the track. Sand box tops to prevent roof drips, rain, etc., from entering the sand box and ruining the sand.

(7) The locomotive will be equipped with two 24-horsepower motors, series wound, totally enclosed but having screen plates, insuring ample ventilation, commutating poles, split-frame type with axle brackets and suspension lugs on the lower frame. The armature will be carried in separate heads clamped between the motor frames and will be provided with self-aligning ball bearings. The field coils shall be insulated with mica and asbestos, completely enclosed in moisture-proof coverings and thoroughly impregnated with insulating compound. The armature coils shall be thoroughly insulated and placed in troughs of insulating material in the slots in the armature core. Special treatment shall be given the armature windings to render them durable under the service they will be required to perform. The commutator bars shall be of hard drawn copper, insulated with mica of proper hardness to wear evenly with the copper. The axle

bearings shall be of ample proportions to insure cool tuning and long life. Arrangements for lubrication shall be conveniently accessible and the oil and grease chambers of liberal capacity. Suitable doors shall be provided in the motor frame for the convenient inspection of the brushes and commutator. During the manufacture and before being placed in the locomotive, the motors shall be subjected to the load and insulation tests recommended for such apparatus by the A. I. E. E. and such additional tests as will thoroughly prove the motors suitable for the duty they have to perform. Motors will be spring suspended from the locomotive frame and will drive the axle through single reduction spur gearing. Gears will be of steel with involute cut teeth, split type, securely keyed to the axle and enclosed in dust proof cases so that they may run in oil. On commutating end, ball bearing inner race to be held in place by a washer and stud screwing in end of shaft.

(8) Controller: The controller will be of magnetic blow-out, cylinder type with the addition of arc master and solenoid switch to eliminate heavy break flash in the controller and will be so arranged that the motors may be started either in series or in parallel. The operating cylinder will have six points, five with resistance in circuit and one with full potential on the motors. The operating and reverse cylinders will be interlaced to prevent incorrect manipulation. Contacts and segments will be of sufficient size to insure long life and cool running and all parts of controller shall be arranged for ready inspection and cleaning. The contact fingers will have renewable burning tips so that the entire finger need not be thrown away when the tip is gone. The segments will not have renewable burning tips.

(9) Resistance: P. G. type steel grid rheostat of sufficient capacity for the operation of the locomotive without excessive heating. We understand there is a resistance now on the market, called the E. M. B., consisting of an endless ribbon element, which is guaranteed for five years and which may be the resistance element to standardize upon, but we have had no experience with it.



A typical Mine Locomotive

\* General Manager, Logan County Coal Corporation.

(10) Headlights: Jeffrey headlight with 94-watt, 110-volt, stereopticon bulbs in series with Ward Leonard resistance tubes. Lights always in circuit when pole is on wire. No switch used.

(11) Protective device: G. E. fuse box (M. A. 14) and ribbon fuse.

(12) Trolley: G. E. Form D-21 mine type trolley, wood pole and trolley wheel carried in a swiveling harp. Must have two sockets so that trolley may be placed on either side or two trolley poles can be used.

(13) Reel: Jeffrey mechanical chain-driven cable reel arranged to pay out cable from controller end. Reel shall contain 400 feet tirex single conductor No. 4 cable.

(14) Reel and pole switches to be plug type.

## B

(1) Size (2) or high coal locomotive: Weight, 6 tons.

Volts, 250.

Motors, 2.

Horsepower of motors, 36.

Control, single end.

Wheels, outside.

Rated D. B. pull, 3,000 pounds.

Starting D. B. pull, 3,600/4,000.

Approximate full-load speed in miles per hour, 6.

Track gauge, standard mine gauge, 44 inches.

Overall width, 54 inches.

Length overall, 13 feet.

Height of frame above rail, 30 inches.

Maximum overall height above rail to trolley wire, 40 inches.

Wheel base, 40 inches.

Diameter of wheels, 26 inches.

Diameter of axles, 4 inches.

Frame, structural steel.

(2) Buffers and draw bars: To suit standard cars. The end channels to be fitted with wood faced with heavy steel protection plates without projecting lugs.

(3) Driving wheels and axles: Driving wheels to be cast iron with steel tires, having 4-inch tread standard contour flange. This flange wears better and gives better braking surface. They shall be pressed on and keyed to open-earth steel axles which shall be finished all over and without shoulders.

(4) Journal boxes: Railway type with removable linings lubricated from oil cellars filled with waste. Linings should be of a composition metal that will not break—the end of the linings in Jeffrey journals frequently break up and drop in oil cellar—but will not ruin the axle if permitted to run dry for a short time which brass linings do. The weight of the locomotive will be supported from the journal boxes on heavy, semi-elliptic equalized springs.

(5) Brake: Automatic locking screw and levers so proportioned that braking effect sufficient to lock the wheels can be

readily obtained. Shoes to be simple one-piece castings, readily removable and adjustable. Wearing parts of brake rigging such as screw and yoke to be as simple and inexpensive as possible.

(6) Sanding device: Four sand boxes fitted with positive-acting, self-closing valves. Valves will be arranged to operate in pairs with the lever handles located within convenient reach of the motorman. Rubber hose sand spouts provided to direct sand on rails. Sand levers and rods to be above the bottom level of frame so that they will not be broken every time the locomotive jumps the track. Sand box tops to prevent roof drips, rain, etc., from entering the sand box and ruining the sand.

(7) Motors: Locomotive will be equipped with two 36-horsepower motors, series wound, totally enclosed but having screws, insuring ample ventilation, commutating poles, split-frame type with axle brackets and suspension lugs on the lower frame. The armature will be carried in separate heads clamped between the motor frames and will be provided with self-aligning ball bearings. The field coils shall be insulated with mica and asbestos, completely enclosed in moisture-proof coverings and thoroughly impregnated with insulating compound. The armature coils shall be thoroughly insulated and placed in troughs of insulating material in the slots in the armature core. Special treatment shall be given the armature windings to render them durable under the service they will be required to perform. The commutator bars shall be of hard-drawn copper, insulated with mica of proper hardness to wear evenly with the copper. The axle bearings shall be of ample proportions to insure cool winding and long life. Arrangements for lubrication shall be conveniently accessible and the oil and grease chambers of liberal capacity. Suitable doors shall be provided in the motor frame for the convenient inspection of the brushes and commutator. During the manufacture and before being placed in the locomotive, the motors shall be subjected to the load and insulation tests recommended for such apparatus by the A. I. E. E. and such additional tests as will thoroughly prove the motors suitable for the duty they have to perform. Motor will be spring suspended from the locomotive frame and will drive the axle through single-reduction spur gearing. Gears will be of steel with involute cut teeth, split type, securely keyed to the axle and enclosed in dust-proof cases so that they may run in oil. On commutating end ball bearing inner race to be held in place by a washer and stud screwing in end of shaft.

(8) Controller: The controller will be of magnetic blow-out, cylinder type with the addition of arc master and solenoid

switch to eliminate heavy break flash in the controller and will be so arranged that the motors may be started either in series or in parallel. The operating cylinder will have six points, five with resistance in circuit and one with full potential on the motors. The operating and reverse cylinders will be interlocked to prevent incorrect manipulation. Contacts and segments will be of sufficient size to insure long life and cool running and all part of controller shall be arranged for ready inspection and cleaning. The contact fingers will have renewable burning tips so that the entire finger need not be thrown away when the tip is gone. The segments will not have renewable burning tips.

(9) Resistance: P. G. type steel grid rheostat of sufficient capacity for the operation of the locomotive without excessive heating. We understand there is a resistance now on the market, called the E. M. B., consisting of an endless ribbon element, which is guaranteed for five years and which may be the resistance element to standardize upon, but we have had no experience with it.

(10) Headlights: Jeffrey headlight with 94-watt, 110-volt, stereopticon bulbs in series with Ward Leonard resistance tubes. Lights always in circuit when pole is on wire. No switch used.

(11) Protective device: G. E. fuse box (M. A. 14) and ribbon fuse.

(12) Trolley: G. E. Form D-21 mine type trolley, wood pole and trolley wheel carried in a swiveling harp. Must have two sockets so that trolley may be placed on either side or two trolley poles can be used.

(13) Reel: To be G. E. flat top, vertical axis, electric driven, arranged to pay out cable from controller end. Reel to contain 500 feet No. 2 tirex single-conductor cable.

(14) Reel and pole switches to be plug type.

## TRIP LOCOMOTIVES

(1) Trip locomotives shall be 10 tons in weight. If the haul requires a heavier locomotive, two 10-ton units will be operated in tandem. The specifications of these units are as follows:

Weight, 10 tons.

Volts, 250.

Motors, 2.

Horsepower of motors, 60 each.

Control, single end.

Wheels, inside.

Rated D. B. pull, 5,000 pounds.

Starting D. B. pull, 6,000 pounds.

Approximate full-load speed in miles per hour, 8.

Track gauge, 44 inches.

Overall width, 69 inches.

Length overall, 168 inches.

Maximum height above rail, 51 inches.

Wheel base, 61 inches.

Wheel diameter, 30 inches.

Diameter of axles, 5 inches.

(2) Frame: Sides of armor plate. End frames steel channel, fitted accurately at joints and held rigidly together with heavy corner angles and large through bolts and rivets.

(3) Bumpers and draw bars: To suit standard cars. The end channels to be fitted with wood faced with heavy steel protection plates without projecting lugs.

(4) Driving wheels and axles: Driving wheels to be cast iron with steel tires, having 4-inch tread standard contour flange. This flange wears better and gives better braking surface. They shall be pressed on and keyed to open-hearth steel axles which shall be finished all over and without shoulders.

(5) Journal boxes: Railway type with removable linings lubricated from oil cellars filled with waste. Linings should be of a composition metal that will not break—the end of the linings in Jeffrey journals frequently break up and drop in oil cellar—but will not ruin the axle if permitted to run dry for a short time which brass linings do. The weight of the locomotive will be supported from the journal boxes on heavy, semi-elliptic equalized springs.

(6) Brakes: Automatic locking screw and levers so proportioned that braking effect sufficient to lock the wheels can be readily obtained. Shoes to be simple one-piece castings, readily removable and adjustable. Wearing parts of brake rigging such as screw and yoke to be as simple and inexpensive as possible.

(7) Sanding device: Four sand boxes fitted with positive acting self-closing valves. Valves will be arranged to operate in pairs with the lever handles located within convenient reach of the motorman. Rubber hose sand spouts provided to direct sand on rails. Sand levers and rods to be above the bottom level of frame so that they will not be broken every time the locomotive jumps the track. Sand box tops to prevent roof drips, rain, etc., from entering the sand box and ruining the sand.

(8) Motors: Two 60-horsepower motors. Same specifications as for 6-ton locomotive.

(9) Controller: G. E. contactor type consisting of master controller reverse unit and five contractors so arranged that motors may be started either in series or in parallel. The operating cylinder will have six points, five with resistance in circuit and one with full potential on the motors. The operating and reverse cylinders will be interlocked to prevent incorrect manipulation.

(10) Rheostat: Same specifications as for 6-ton.

(11) Headlights: Two G. E. Form H-4 incandescent headlight.

(12) Protective device: G. E. MA-14 fuse box and ribbon fuse. Overload re-

lay resetting on first point of controller also to be furnished.

(13) Trolleys: Same specifications as for 6-ton.

It will be noted that no mention is made of storage battery locomotives. The writer has had very little experience with the later types and has used only old types which were taken over with mines which were purchased. There are many who are very favorably inclined to storage battery locomotives, particularly in gassy mines, while many others believe that they have not reached a sufficient state of perfection. The subject is further complicated by adoption of systems of mining in which the coal from the rooms is loaded into cars on the entries.

It is the opinion of the writer that a full description as to the merits of the two types of equipment would take far more space than should be given in one article, and that the storage battery locomotive should be treated in a separate writing.

No mention is made of Crab reels, because they are rarely used in newly equipped mines, and it is the general belief that they are not economical except where the grades are such that excessive power and upkeep is occasioned in taking the locomotive to the face. There is also the opinion that where such a condition exists, greater efficiency can be obtained by installing small room hoists so the loaders can put their cars on the entry.

### WAR MINERALS RELIEF WORK TO END

**R**ETURN of an unexpended balance estimated at \$1,000,000 to the Treasury of the United States from the War Minerals Relief Fund will be made as soon as the final disposition is made of a few remaining claims, Secretary Work of the Interior Department has announced.

With a decision by the Supreme Court of the United States to the effect that purchase price of real property and interest on borrowed capital shall not be allowed by the Government in settling War Minerals Relief claims, the War Minerals Relief of the Government had been practically ended.

Conclusion of the work was being held up pending this decision, which, had it been decided adversely, would have resulted in the necessity of reliquidating many of the claims, Secretary Work explained.

Settling of these claims has been expedited during the past two years. On May 1, 1923, there were 537 War Minerals Relief claims unsettled against the Government. Now there are 15 awaiting adjustment. A commission for

handling these claims was also abolished on May 1, 1923, and the work transferred to the Solicitor's office of the Interior Department. The monthly pay roll at that time amounted to \$3,033 with 13 employees. This force now consists of a Commissioner and two assistants, and within a month will be reduced to one.

It is planned by the Interior Department to immediately dispose of the few disputed claims, thus winding up the War Minerals Relief for all time.

### PRODUCTION OF ALUMINUM IN 1924

**T**HE new aluminum produced in the United States in 1924 had a value of \$37,607,000, which is an increase of almost one-third over the value of the output in 1923, according to a statement issued by the Geological Survey. Aluminum of 99 percent grade was quoted at 27 cents a pound during the first week in January, but the price rose to 28 cents and remained stationary until the middle of March. During April, May, June, and July the price was 28-29 cents, but in August it was 28 cents, where it remained until the end of the year. The price of metal of 98 percent grade was steadily 1 cent under that of the purer metal. The domestic demand for aluminum, much of it for automobile parts, was somewhat less in 1924 than in 1923, as the production of automobiles was smaller and some manufacturers are now using pressed steel instead of the higher-priced aluminum.

The imports of aluminum in 1924 were nearly one-third less than in 1923, whereas the exports in 1924 increased 25 percent over those in 1923. The total imports in 1924 amounted to 30,588,525 pounds, which comprised 29,394,155 pounds of crude metal from scrap and alloy; 790,130 pounds of manufactured plates, sheets, and bars; and 404,240 pounds of hollow ware. The total exports amounted to 13,126,752 pounds, which comprised 3,356,786 pounds of ingot, scrap, and alloys; 2,986,726 pounds of plate, sheets, bars, strips, and rods; 3,574,427 pounds of tubes, moldings, castings, and other shapes; 1,026,593 pounds of table, kitchen, and hospital utensils; and 2,182,220 pounds of all other manufactures.

The American Engineering Standards Committee announces that it has decided to postpone indefinitely the conference on the standardization of valves, which has been under discussion during the past two years. The postponement is taken as the result of a request to this effect by the Manufacturers Standardization Society of the Valves and Fittings Industry.

## STANDARDIZATION APPLIED TO ARIZONA SMELTERS

*The Enormous Progress In Smelter Equipment From The Days Of The "Old Black Copper Furnace" To The Modern Reverberatory Furnace Is Largely Due To Standardization Of Equipment And Methods Which Has Lowered Costs And Given Greater Percentage Of Metallic Recovery*

By G. W. PRINCE\*

FOR several years Arizona has been our greatest copper-producing state, and it is here that the greatest progress in the standardization of equipment and methods has taken place.

The old black copper furnaces with their army of feed-floor laborers, their hand-pushed slag pots and their 3 percent copper slags have given way to the modern reverberatory furnace where men are few and the 0.2 to 0.3 percent copper slag are handled in electrically hauled and motor-dumped slag pots, of from 10 to 15 tons capacity. Mechanical handling and the more thorough mixing of charges permit the smelting of tonnages unthought of in the old days, and a tremendous increase in copper production has come as a matter of course.

All the copper smelters built since 1910 in Arizona have made the position of the multiple-hearth, air-cooled furnace for roasting, the reverberatory furnace for smelting, and the 12-foot Great Falls type magnesite-lined converter preeminent. At the present time all the smelters in operation in the state are equipped with some type of air-cooled roaster, the Wedge, Herreshoff and McDougal being the types in use.

At this time there is no strictly blast-furnace plant in operation in the state, and only two smelters, the United Verde at Clarkdale and the Copper Queen at Douglas, regularly operate blast furnaces. In each of these plants special conditions, rather than low costs, make it advisable to continue the operation of blast furnaces for the time being. At the United Verde semi-pyritic smelting and careful furnace operation permits the use of less than 4 percent coke for long periods, and even then costs are higher than for reverberatory smelting. Two other smelters, the United Verde Extension at Clemenceau and the Calumet & Arizona at Douglas, maintain blast furnaces for emergency use.

Several of the smelters, such as

the International at Miami, the Phelps-Dodge at Clifton, and the American Smelting & Refining at Hayden, smelt charges consisting almost entirely of concentrates; while the Copper Queen and Calumet & Arizona at Douglas and the Magma at Superior smelt mixed ores and concentrates, and the United Verde at Clarkdale and the United Verde Extension at Clemenceau smelt a charge consisting entirely of screened or crushed mine ore.

After a careful bedding, mixing and roasting of the charge the calcines are hauled to the reverberatory furnaces and distributed along the side walls, which protects them and exposes a large surface of the calcine for the absorption of heat. Great care is taken to prevent loss of heat and dust between the roaster and the reverberatory furnace.

The reverberatory furnaces vary from 96 to 120 feet in length, and from 19 to 26 feet in width, and smelt from 400 to 900 tons of solid charge per day. The use of oil for fuel in these furnaces is universal, except in the case of the United Verde and the United Verde Extension smelters, where it is found more economical to use pulverized slack from the coal fields at Gallup, N. Mex.

Reverberatory furnaces are equipped with a pair of waste-heat boilers of from 500 to 750 horsepower each, which recover from 30 to 55 percent of the value of the fuel as waste heat, the use of the Sterling boiler for this purpose being almost universal. When the reverbera-

tory furnace was first introduced in the Southwest it was considered good practice if one could smelt a ton of charge per barrel of fuel oil burned, and the slags usually averaged about 0.5 percent copper. Through constant care and a better understanding of combustion conditions and of smelting mixtures, these figures have been cut in half. Furnaces are now smelting 2 tons of solid charge per barrel of oil, and slag losses below .25 percent copper are constantly maintained at some plants.

The limit has not yet been reached, as lower fuel ratio and lower slag losses are being almost constantly reached at the different plants. Fuel consumption is from 2,500,000 to 5,000,000 b. t. u.'s per ton of solid charge at the different smelters. This is due to greater care in the preparation of the charge and closer supervision of combustion conditions at some plants than at others.

In converting practice, the use of the 12-foot Great Falls converter is almost universal, there being only two or three converters of other types in operation in the state. The ease with which the magnesite linings of these converters are repaired and the fact that the lined shells are readily handled by cranes have been a big factor in favor of their use. These converters easily average a production of 50 tons of copper per converter day when working on a 35 to 40 percent matte, and with proper care these linings may be made to last almost indefinitely.

Standardization of smelting equipment in Arizona has made it easy to compare tonnage and cost figures at the different plants, and has been a tremendous factor in the enormous increase of tonnages smelted per unit and in the reduction of losses and the lowering of costs. These same factors will continue to make Arizona the nation's greatest and most progressive copper state for many years to come.



Concentrator of the Inspiration Consolidated Copper Company, Miami District, Arizona

\* Assistant General Manager, United Verde Extension Mining Company.

Ransome, U. S. Geological Survey.

## THE COPPER INDUSTRY AND STANDARDIZATION

*The Mining Industry Will Soon Find It Necessary To Make An Intensive Study of Various Operations Of Mining With A View To Introducing Standardization On A Large Scale—This Will Involve Changes In Mining Methods, Practice And Equipment*

**F**OR five consecutive years the effort to work out standards for the mining industry has been carried forward.

During these five years the industry has passed through an unprecedented crisis, and yet, in spite of well known difficulties, the committees composing the Standardization Division of the Ameri-

By CHAS. A. MITKE\*

ducers with large capacities have been added to the world's list of producing mines, and it is within the limits of possibility that in the comparatively near future a condition may be reached where, for over a period of years, we may see a tremendous demand for the

cedure may involve many changes in mining methods as well as the liberal use of standards wherever possible.

The material submitted by the Standardization Division this year includes final reports by the Committees on Mine Sampling, Underground Loading Machines and Fire Fighting Equipment, while other committees whose work is not yet sufficiently complete to be incorporated in a final report are merely submitting progress reports.

When the committees were first formed in 1920 questionnaires were passed around so as to obtain information on the various subjects taken up by the different committees. In this manner the general field of mining was pretty thoroughly covered. There were also numerous discussions among committee members on debatable points, especially in regard to drilling machines, drill steel, mine ventilation, transportation,



Ransome, U. S. Geological Survey.

can Mining Congress have compiled valuable material for incorporation in no less than five large bulletins.

During the past year we have experienced a slight curtailment in copper production by a number of companies, due to low prices for this metal. Iron was also low, but lead and silver had the advantage of a rising market. While the demand for copper was good, the production so closely approximated the demand that the price in many cases permitted but a very small margin of profit. At present there are some who believe that relief for the present situation will come in the form of another boom, similar to that now being enjoyed by the lead industry, while others are seeking artificial relief through legislation.

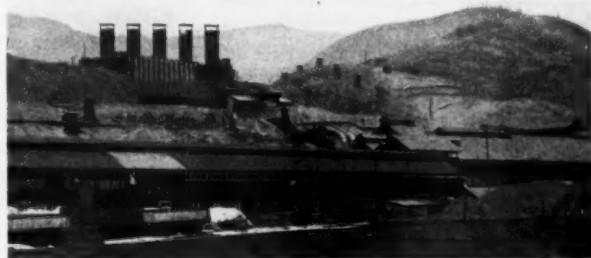
It has been the experience of practically every great industry that the law of supply and demand is ultimately the governing factor, and so long as production and consumption continue to run as close a race as they have during the past few years, the possibilities of a very high price for copper would seem somewhat remote.

Consumption of copper in recent years has increased tremendously, but production has followed it by a very close margin, and while legislation may provide temporary relief and improvements in the European situation may increase the market demand, these will also stimulate production.

During recent years many new pro-

*Miami Plant and Concentrator, Miami District, Arizona.*

*Right, Kennett Copper Smelter of the United States Smelting, Refining and Mining Co. at Kennett, Calif.*



duced metal, met by a correspondingly large production, closely approximating the demand and resulting in a fairly low price per pound for copper. This would necessitate operating on a very small margin of profit if many of our large companies are to continue in the competitive field, and in order to exist they would then be compelled to find relief through the lowering of production costs.

Some years ago the large industrial plants were confronted with similar conditions and met them by making it possible through an intensive study of their units of work for every man to produce a great deal more with the same amount of effort.

It may only be a question of a short while before the mining industry will find it necessary to make the same intensive study of the details comprising the various operations of mining with a view to introducing standardization on a large scale, and thus making it possible to show a profit on a comparatively low price per pound of copper. Such a pro-

underground loading machines, and other subjects.

The Metal Mining Branch has submitted five major reports—Ventilation, Underground Transportation, Mechanical Loading Underground, Fire Fighting Equipment, and Mine Sampling—to the American Engineering Standards Committee, for approval as Standard and Approved American Metal Mining Practice. The report of the Committee on Ventilation has already been presented to the Reviewing Committee, functioning under the Mining Standardization Correlating Committee, and one meeting of the committee has been held. The other four reports were submitted in January of this year, and the reviewing Committees are now in process of formation. It is anticipated that before the next Standardization Conference these reports will be officially released by the American Engineering Standards Committee. New committees are in process of formation and the work will go forward this year with added impetus.

\* Consulting Engineer, Bisbee, Arizona. Chairman, Metal Mining Branch National Standardization Division, The American Mining Congress.

## PROGRESS IN STANDARDIZED AND APPROVED COAL MINING PRACTICE AND EQUIPMENT

*Eight Major Committees Composed Of Approximately Two Hundred Coal Mine Operators, Engineers And Manufacturers Have Devoted Five Years' Effort To The Solving Of Cost Reduction Problems—This Article Is A Review Of What Has Been Accomplished So Far, And What Is To Be Undertaken In The Immediate Future*

**B**EFORE proceeding to review the work of the Coal Mining Branch of the Standardization Division of the American Mining Congress for the past year, it seems best to give the status of this work at the close of last year. The work of the Standardization Division for the year 1923 is all included in the Fourth Standardization Bulletin, which was issued soon after the Fourth National Standardization Conference, held in Milwaukee, Wis., September 24 to 29, 1923. The Fifth Standardization Bulletin, carrying proceedings and reports to the Sacramento, California, meeting, September 29, 1924, is just off the press and ready for distribution. These bulletins contain not only the full proceedings of the Standardization Conferences but the reports of all the committees for both the Metal Mining Branch and the Coal Mining Branch, together with the discussions of these reports at these conferences. However, as these reports are voluminous it seems best to make a brief statement of the status of our work at the beginning of this year.

The standardization work of the Coal Mining Branch is divided into eight classifications, namely:

- Underground transportation:
- Underground transmission.
- Power equipment.
- Underground mining and loading equipment.
- Mine drainage.
- Mine ventilation.
- Mine timbering.
- Outside coal handling equipment.

Standardization of the methods, machinery and equipment for each of these classifications is under the direction of a committee composed of representatives of the coal mining industry, manufacturers of mining equipment of this particular classification, consulting mining engineers, and the Government Departments interested in the work. These committees usually have subdivided their work into several classes, and the investigations required for the preparation of reports on standardization are carried on by these subcommittees who report back to the main committee. This brief statement indicates the thorough manner in which this standardization

By WARREN R. ROBERTS\*

work is carried on by our committees.

With this picture of our work before you, you can more readily grasp the following statement regarding the progress of our work.

Of the eight main committees mentioned above, six committees rendered to the 1923 conference complete reports



Col. W. R. Roberts

with specifications and recommendations which were considered sufficiently final to be submitted to the American Engineering Standards Committee for their consideration and approval.

In addition to these six reports from the Coal Mining Branch, the Metal Mining Branch at the same time submitted one report on "The Ventilation of Metal Mines." The reports submitted by the Coal Mining Branch were from the Committees on Ventilation of Coal Mines, Underground Transportation, Mine Drainage, and Outside Coal Handling Equipment, and a joint report by the Committees on Power Equipment and Power Transmission.

These reports were submitted to the American Engineering Standards Committee through the Mining Standardization Correlating Committee, a subsidiary committee of the American Engineering

Standards Committee appointed and directed to review these reports and advise the A. E. S. C. of their findings and recommendations.

The Mining Standardization Correlating Committee, in accordance with the methods of procedure of the A. E. S. C., then proceeded to form sectional committees—one to review each of these reports. These sectional committees have representatives from each of the national engineering societies, trade associations, governmental bureaus, and other organizations interested in the work covered by reports.

Of the reports submitted in the manner outlined above to the Mining Standardization Correlating Committee, sectional committees have been formed to review the reports of our committee on—

1. Coal mine ventilation;
2. Underground transportation;
3. Mine drainage; and
4. Outside coal Handling equipment.

And also for the report of the Metal Mining Branch on their report for mine ventilation of metal mines. Articles in this issue by Dean E. A. Holbrook and Dr. P. G. Agnew, give the status of these projects.

I wish, however, to review the reasons advanced by the Mining Standardization Correlating Committee as to why some reports submitted have not been acted upon. The report by our Committee on Outside Coal Handling Equipment was considered by the Mining Standardization Correlating Committee to contain certain specifications and recommendations on certain classifications of mining materials and equipment which were of interest to so many other organizations that they did not think best to take up the review of this report at the present time. We replied to this objection to the consideration of our report at the present time with the suggestion that, since this report contained many specifications and recommendations of vital interest to the coal mining industry in which no outside organizations seem to be interested, that it would be best to appoint a sectional committee at the present time to consider our report with instructions to this committee to omit from their consideration such specifications and recommendations as the Mining Standardization Correlating Commit-

\* President, Roberts & Schaefer Company, Chairman, Coal Mining Branch, Standardization Division, The American Mining Congress.

tee might consider inadvisable to review at this time.

This report has been recently considered and in accordance with the above suggestions three committees have been appointed to review the recommendations on wire rope ladders, and miscellaneous outside coal handling equipment.

The joint report of our Committees on Power Equipment and Power Transmission which were submitted to the Mining Standardization Correlating Committee for review and recommendations also found objectors, especially from the Bureau of Mines, as the Bureau had submitted to the Mining Standardization Correlating Committee for review and approval a report on "Safety Rules for Installing and Using Electric Equipment for Coal Mines." This particular report from the Bureau of Mines is always referred to as Technical Paper No. 138, and is classified in the Year Book of the American Engineering Standards Committee as "Project M-2."

At a meeting of the Mining Standardization Correlating Committee discussing the matter of appointing sectional committees for the review of our reports it was finally agreed that a sectional committee would first be appointed to review this Project M-2 submitted by the Bureau of Mines, and that as soon as this sectional committee had reported their findings to the Mining Standardization Correlating Committee this latter committee would then appoint a sectional committee to review our joint report above referred to.

The sectional committee to review this Project M-2, submitted by the Bureau of Mines, was duly appointed with the Bureau of Mines and the American Mining Congress as sponsors, and with representatives from some other societies and organizations as were interested in this project. We understand that a meeting of this sectional committee was held several months ago, and after carefully reviewing the report and making certain modifications, sent up their approval of the report with these modifications to the Mining Standardization Correlating Committee. This committee was then, according to arrangements previously agreed upon, to appoint a sectional committee to review our joint report. This, however, we believe up to date has not been done, and we hope to have this sectional committee appointed to review our report at an early date.

To review the report of our Committee on Underground Transportation, the Mining Standardization Correlating Committee has formed a sectional committee with representation from the following organizations:

American Railway Association;  
American Institute of M. & M. Engineers;

American Mining Congress;  
American Railway Engineering Association;  
American Society of Civil Engineers;  
Anthracite Coal Operators' Association;  
U. S. Bureau of Mines;  
Coal Mining Institute of America;  
Electric Power Club;  
National Coal Association;  
Manufacturers of Track Materials;  
Manufacturers of Cars and Car Wheels; and  
Consulting Engineers.

I have given the list of the organizations represented on this sectional committee purely to illustrate the care taken in reviewing these reports to prevent any specifications or recommendations being adopted and recommended to the industry as standards until every interest has been satisfied and approve of our recommendations. This should thoroughly satisfy the industry, for whom the reports were especially prepared, that they should have no hesitation in adopting the recommendations made in our reports.

It will now be of interest to review briefly the findings of the sectional committee, which met recently to review the report of our Committee on Mine Drainage. Such a review will illustrate the class of criticism that is made against the recommendations contained in our reports and act as a guide to our committees in the future.

I have recently received from the chairman of the sectional committee reviewing this report a full copy of the findings of the committee, and after reading it very carefully I can summarize the principal objections as follows:

It was the consensus of opinion of the committee that the specifications and recommendations in our reports should either be very general or conversely go very much into detail. I draw from this statement that if the specifications and recommendations were very general and did not go too much into detail that then a committee would find no objections to them, except in particular instances where they made some corrections. But if instead our committees preferred to go into detail regarding specifications for equipment, then they should go sufficiently into detail to make their recommendations absolutely clear and complete.

Another specification applying to pumps for development work was criticised as not being broad enough in its scope and differentiating between pumps to be used in different mines where the water handled required the pump to have such parts as necessary acid resisting, whereas such requirements would not be necessary at some

other mine where the water did not require this same provision.

Our representatives on this sectional committee suggested that this specification could be easily revised to meet this requirement.

The representative on the sectional committee from one of the pump manufacturers thought that the specifications were too narrow to be of value and he doubted whether a specification could be drawn that would be broad enough to cover pumps for the customary diversified services to be met with in mining. He also suggested from a reading of the specifications that they seemed to be made too largely in the interest of the centrifugal pump manufacturer. This particular criticism we are unable to appreciate as the manufacturers of equipment for mine drainage were well represented on our committee which formulated this report.

There were numerous suggestions for changes in detailed parts of the specifications, all of which it would seem to me could be readily corrected and which our representatives on the committee offered to correct in an earnest endeavor to have all the specifications in the report not only satisfactory to all interests concerned but to be of real value to the mining industry.

Another criticism offered was worded as follows:

"We believe that too many detailed specifications should not be included, but the specifications should be drawn so that all pump manufacturers can bid on their standard equipment and thus keep down the cost to the purchaser."

We quite agree with this criticism in its broad application. The spirit of this suggestion should be contained in every specification drawn by our committees. However, the main object of our committees is to improve the methods, practice and equipment of the mining industry, and while we do not wish to impose on this industry any expense not consistent with such improvements in practice, it should be self-evident that usually improvements in practice and equipment necessarily to some extent at least increases cost, but if this cost is justified by the improvement it is no burden but a saving to the purchaser.

We have great confidence that our committees have kept this thought in mind constantly, as it has been repeatedly stressed at all our conferences.

The report closed with a list of corrections and changes in the report which this sectional committee suggested be made in the report to meet with their approval.

We should not expect that our reports as formulated, however carefully and by representatives from the operating end of the mining industry, manufacturers

of machinery and component outside engineers, would always meet with the full and hearty approval of the representatives of other societies and associations who did not assist in the preparation of these reports. This would be against human nature.

We also believe that all this criticism and discussion of our reports by these sectional committees (even though sometimes it may appear severe) will result in the ultimate improvement of the recommendations of our committees, and we confidently believe that all these interests can be harmonized and these reports made satisfactory to all interests and, finally, of very great value to the industry.

The discussion of this report also brings to mind the policy adopted by the Standardization Division when it was organized, at which time the scope and character of the work which our committees were to do was very carefully considered, and at which time our committees were fully advised of the policy to be pursued to make their work of the greatest value to the industry. Our committees have conscientiously followed this policy with the result that we believe in general their recommendations are sufficiently broad and yet sufficiently specific to act as an intelligent guide to the officials of the mining industry in improving methods and practice in mining, and also improving their mining equipment.

#### PROGRESS FOR 1924

I will now review briefly the work of our eight main committees since our last Standardization Conference a year ago:

Six of these committees, namely, the ones on Underground Transportation, Underground Power Transmission, Power Equipment, Outside Coal Handling Equipment, Mine Drainage, and Mine Ventilation, have been working since the Standardization Division was organized five years ago. These six committees are the ones which have completed the first stage of their work and submitted reports to the American Engineering Standards Committee for review and approval, as stated previously in this report. These particular committees having submitted their complete reports as stated above, have not pursued their work vigorously during the present year awaiting the outcome of the review of their reports by the American Engineering Standards Committee. However, many of the subcommittees of these main committees have been pursuing diligently the particular work allotted to them, and some of these subcommittees have rendered additional reports which will be presented to the next Standardization Conference.

Two of our committees organized more recently, namely those on Mine Timbering and Underground Mining and Loading Machinery, and who have not presented completed reports to date, have been pursuing their work but will not present final reports at this time. However, the Subcommittee on Preservation of Mine Timber presented a very lengthy report to the Fifth National Conference indicating a vast amount of research and a compilation of much valuable information. This is a joint report by the two Subcommittees on Timber Preservation for both the Metal and Coal Mining Branches, as on this particular subject the work can readily be combined.

Considering the fact that until recently the timbering in the vast majority of the coal mines of this country was done in the most crude and most unsystematic manner, it is most encouraging to note any progress for better methods. We confidently believe that one of the most important results of the work of our committees for the mining industry is to increase interest in improved methods. This is a slow process of education, but experience teaches us that the beginning of any good work is always the period of least progress, and that this progress will rapidly increase is already evident.

Through the cooperation of the American Mining Congress the United States Bureau of Mines, the United States Forest Service, the United States Geological Survey, and the Bureau of Census, a questionnaire was sent out to the mining industry at large concerning mine timbers. This questionnaire was prepared by the Bureau of Census and submitted to the Standardization Division for suggestions, and was a very complete and lengthy request for information. It is most gratifying to advise that 10,700 replies were received to this questionnaire. These replies are being classified and the information compiled in proper form.

#### INTEREST OF MINING INDUSTRY

When our First and Second Standardization Bulletins were printed they were distributed free to the mining industry, but in rather limited editions, as we could not afford to print large editions. When the Third Standardization Bulletin was ready for distribution it was decided to make a charge of \$1 for each of these bulletins issued to the industry at large. When the Fourth Standardization Bulletin was ready for distribution a much larger edition was printed, and it was decided to double the price of this bulletin to help cover the large expense of its preparation. Approximately 6,000 copies of the third and fourth bulletins have been sold; many

more of the fourth bulletin than of the third. There were approximately 3,500 mining companies that invested in this fourth bulletin. It is reasonable to assume that companies who have purchased these bulletins are making use of them, and thus improving their methods and equipment.

We confidently believe that more progress has been made and more interest created during the past year in the mechanical loading of coal than in all previous years combined since mechanical loading was first introduced. We also believe that the next year is going to see even more marked progress in the adoption of mechanical loading than the past year. All indications point to a very widespread interest in this subject, and many mining officials who took no interest whatever in mechanical loading until recently are now most anxious to find a loader which can be adapted to the conditions in their mines.

We have sufficient confidence in the genius of our people to believe that when they decide they need a thing they will find a way to secure it and make proper use of it.

We have repeatedly made this statement during the past few years and we have not lost confidence in our belief that mechanical loading of coal is entirely practical and within a very short time will be adopted. When that happy day arrives the industry will have to thank the Standardization Division more than any other agency, unless it be the manufacturers of loading machines, for their persistent effort in trying to secure this desired result.

So much for the interest which the Standardization Division has created in the mining industry in this country. Now let us look through the eyes of some of our foreign friends.

#### FOREIGN INTEREST IN OUR WORK

The secretary of our Standardization Division advises me that there is an ever-growing interest abroad regarding the work of our Standardization Division. During the past year the following countries have sent special representatives to America with letters of introduction to the American Mining Congress asking for information concerning our work: Holland, Sweden, Belgium, Scotland, South America and South Africa. These foreign representatives were not only greatly interested in learning what we were doing but expressed great admiration for the progress we have made, and several of them purchased and sent home for distribution among their countrymen large numbers of our Standardization Bulletins. This is a most gratifying testimonial to the work our committees have so faithfully carried forward. (Continued on page 160)

# ORGANIZATION FOR MINE FIRE FIGHTING IN METAL MINES

*Fire In Metal Mines Is A Subject Which Has Not Received The Consideration Its Importance Warrants, And According To Mr. Pickard Few Mines Are Organized To Combat A Fire, Even Though Ample Fire Fighting Equipment Is Available*

By BYRON O. PICKARD\*

**T**HE PRESS has repeatedly emphasized that underground fires in proportion to actual property loss, cause greater consternation among the workmen and even among the executive staff as well, than any other hazard in mining. This is due mostly to lack of preparedness or lack of prearranged plans, and to little understanding of underground fires.

The Bureau of Mines, through its field force, has made many studies of conditions at time of mine fires and published in 1916 a handbook by J. W. Paul and H. M. Wolfen, entitled "Rescue and Recovery Operations in Mines After Fires and Explosions" which is available for free distribution. However, a review of the reports of Bureau engineers indicates that at but few mines is the management thoroughly organized to combat a fire underground even though ample fire-fighting equipment is provided. There are numerous instances in the history

of disasters from metal-mine fires where 24 and even 48 hours, and sometimes a week, has been absolutely lost before well-devised plans were put into effect. While the management was trying to find itself the fire kept on burning following the laws of nature that govern the actions of fire. Obviously, the fire must be attacked quickly if lives are to be saved and property and financial loss averted. The following memorandum by a Bureau of Mines engineer is similar to several which have come to my attention in the past few years. It is quoted as an illustration of what can happen when the management of a large mine is not prepared.

"Fire started on Sunday night. The Bureau of Mines rescue car was not called until Thursday. We arrived Friday noon. The fire did not spread up shaft from the A level, where it originated, in spite of the fact that the shaft was upcast, but it struck down and before we could get it bulkheaded and sealed, 1,500 feet of shaft

was lost. This shaft was the pumping shaft and carried all power cables, so it was a serious blow. Caving of a shaft pillar affected a nearby hoisting shaft, and it will cost the company something to repair the damage. I doubt very much if the burned shaft can be recovered. There was no organization in the handling of the fire. Men were not properly trained and

an intelligent attack. If a fire is quickly discovered and extinguished in its incipency, the news rarely reaches the public; sometimes even the superintendent does not hear of it, and if he does, he is an exception if he uses the information as a warning of the hazard existing in his mine and if he analyzes the conditions that prevented a catastrophe.

Fires underground do not follow the habits of fires on surface. There are many conditions to vary their burning speed, their path and their extent. They

are not easily reached, and more frequently than otherwise the smoke and gases block the main avenues of approach.

Surface fires can be controlled by city fire departments in short order if the department is promptly notified, but it is not often that city firemen can enter mines with their apparatus and fight underground fires. City fire departments could not extinguish surface fires promptly if

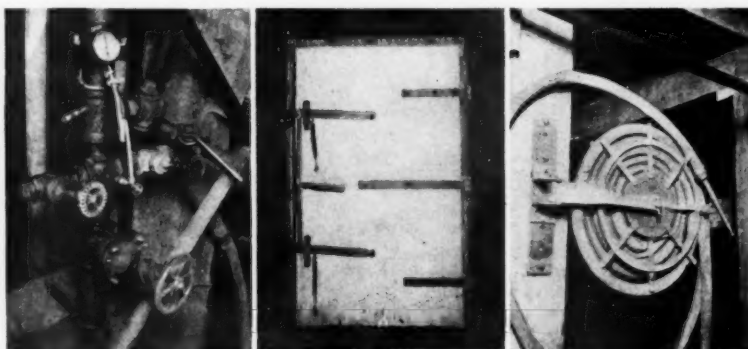
the personnel were not properly organized, carefully drilled, always ready and conversant with the habits of fires. Is there not much to learn from them which may be applied in modified ways to underground conditions?

The basis of any organization for any effort expended or to be expended, is a leader or a boss, whose authority is final. For lack of a better title, call him "chief." He, to be successful, must take his position seriously and study the problems and obstacles which will confront him in carrying on the business assigned to him. In case of mine fires, he must be convinced that it will be possible for a fire to start and that it will generate smoke and gas. He must endeavor to ascertain where fires may start, the directions smoke and gases will travel, and other problems. With this in mind, he can appoint a staff of assistants divided into two units:

(a) A fire prevention unit with provision for careful daily or shift inspection of workings and report, and

(b) A fire-fighting unit.

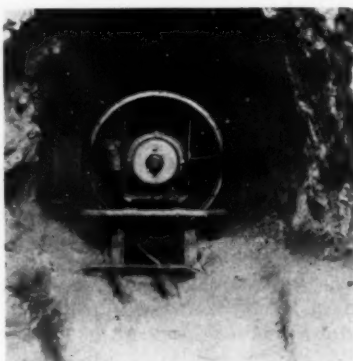
It is the principle purpose of this article to discuss the second unit,



Left, By-pass with Pressure Regulator for Utilizing Water in Pump Column. Center, Steel Fire Door in Concrete Bulkhead. Right, Fire Hose on Portable Reel.

their apparatus was not in shape. I believe this fire could have been stopped at the A level and would not have reached the shaft if the operators had had the proper organization to discover and attack the fire promptly."

The underground fire fighting problem and property loss are relatively large or small depending upon the promptness of



Emergency, Adjustable Portable Pressure Fan for fire fighting purposes used by the Globe Miami Co-operative Mine Rescue Station.

\* District Engineer, Bureau of Mines. Published by approval of the Director, Bureau of Mines.

namely, Organization for Mine Fire Fighting.

The chief should first call upon his staff for a fire survey of the mine and have the chief engineer prepare a special map upon which may be placed assumed fire hazards and the places at which fires may start. The ventilation engineer should be required to outline the air currents (direction, velocity and volume) and furnish the chief with a report showing the probable effects of any fire on ventilation and where bulkheads and fire doors must be placed to control a fire with the least effect to operations. The fire prevention engineer should mark on this map the location of all fire fighting equipment. As mining operations are continually changing conditions underground, this map should be brought up to date at frequent regular intervals.

From these data, the chief can draw up his plans for fire fighting in each particular zone. By referring to his map, he will know which fire doors must be closed and how; who is available to close them; what fire fighting equipment is available, etc.

The chief should then outline his fire fighting organization and if he profits by the experience of others, he will divide his fire fighters into three divisions, namely, 1—oxygen breathing apparatus wearers; 2—underground fresh air men (made up of mechanics, trackmen, pumpmen, electricians, timbermen, miners and general workmen); 3—surface men. Each of these divisions should be put in charge of an assistant chief, namely, one in charge of the apparatus men and apparatus work (generally the safety engineer), one in charge of the supporting fresh air men (generally the mine foreman) and one in charge of the surface men (generally the master mechanic or surface boss).

The work of the apparatus men is principally reconnaissance in limited gaseous areas, temporary restoring of ventilation, establishment of fresh air bases and such work as it is absolutely necessary to do in poor air. It is also the duty of the apparatus men to guard the supporting fresh air men so that there will be no danger of gas or smoke reaching them. Breathing apparatus men should not be required to use any of their strength in fresh air where the same work can be done by fresh air supporters. The nature of their apparatus is such that their work must be done in short periods of less than two hours so they must have all the support and assistance possible in order that precious time will not be lost. This can be done

by fresh air men through laying of water and air lines, building of brattices and bulkheads, bringing in of supplies to the fresh air bases and carrying out dead bodies, etc., etc. The breathing apparatus men should be so organized that all of their effort will not be expended in the first few hours.

The writer has found that dividing the men into groups or shifts for day work and for night work, preferably four groups, two for day and two for night, is very satisfactory. A leader should be appointed to head each group, who takes his orders from the chief apparatus man.

The chief apparatus man should know the breathing apparatus personnel of



*Emergency Mine Rescue Apparatus Station used by the Globe Miami Cooperative Mine Rescue Station.*

adjoining mines and make mutual arrangements with each neighbor operator for assistance at times of emergency. These outsiders will have to be provided quarters for sleeping and eating, and carefully handled in order to keep their interest and loyalty.

All reserve supplies for apparatus and apparatus men should be arranged with a substantial amount immediately available.

The location of the surface fire fighting base should be predetermined and conveniently established. There should be one man in charge of all supplies for fire fighting with a suitable number of assistants available at time of fire. There should be an ample supply of water with a man in charge to insure no interruptions to delivery. The fire fighting chief should place reliable checkers at all mine openings to check in and out all workers and victims.

Other points which the fire fighting chief should have in mind as requiring decisions at the time of fire are the following:

- 1—Guards to prevent unauthorized changing of ventilation fans.
- 2—A positive system of identification and care of dead bodies.
- 3—Notification of state and other legal authorities.
- 4—The care of families of victims; (best turned over to Red Cross).

5—Policing of surface in order that the curious public will in no way interfere with fire fighting operations.

6—A technical staff such as gas analysts, draftsmen, blue printers, etc.

7—An information bureau to take care of the press, etc.

8—A hospital unit supplemented with trained first-aid men should be organized with definite locations for an emergency base both on surface and underground. The chief surgeon should be required to outline plans for first-aid treatment for injured men and the revival of entombed men, etc.

9—The power providing agency should be notified to guard against any interruptions to service for hoist and fans during time of fire.

The underground bosses and more especially the shift bosses should be repeatedly and regularly instructed at frequent intervals as to their responsibilities at time of fire. They should be impressed with the thoughts that particular attention should be given to giving an immediate warning to surface upon discovery of the fire, to extinguish it if possible and to protect the men under them from the gases. Each boss and for that matter, every underground man should be kept thoroughly advised of the management's preparedness. It is customary at many mines to hold monthly meetings of officials, bosses and certain underground key men, particularly the haulage men, to discuss fire prevention and fire fighting problems. This is recommended for any mine in which the hazard is sufficient to warrant it. Fire drills of all underground men should be held at regular intervals, followed by a short talk by the shift boss or foreman to the underground men, instructing them in their duties at time of fire. Each underground man should be familiar with the dangers of gas and smoke resulting from fires and taught how to protect himself from them through using the proper escape ways and in event this is impossible, how to build a barricade. The various locations of possible barricades should be predetermined and explained. The breathing apparatus men should be carefully trained and thoroughly familiar with the underground workings. They should not only know their apparatus, but should be experienced in building bulkheads and brattices, handling hose, fire extinguishers, etc. The fire fighting equipment should be tested at frequent regular intervals.

Each and every assistant working under the command of the chief should insist upon the strictest discipline at time of fire, for the disobeying of any order may not only cause delay, but loss of life.

Briefly, the organization described heretofore is based on the following outline:

1. Fire Chief (General Superintendent of Mines)

A. Board of Advisors

- 1—Chief Engineer
- 2—Ventilation Engineer
- 3—General Underground Foreman
- 4—Supply Clerk
- 5—Company Surgeon
- 6—State Mine Inspector.

B. Fire Fighters.

- 1—Assistant chief in charge of breathing apparatus men
  - a—Four shift captains
  - b—Apparatus crew captains and apparatus men
- 2—Assistant chief in charge supporting fresh air men for underground work.
  - a—Two shift bosses.
  - b—Several groups composed of underground specialists, such as electricians, track layers, timbermen, etc.
- 3—Assistant chief in charge of surface men.
  - a—Two shift bosses.
  - b—Specialized workmen such as hoisting engineers, compressor men, pumpmen, electricians, shaftmen, mine rescue station, mine supplies, telephones.

C. Miscellaneous Aides.

- 1—Engineer in charge engineering work
- 2—Gas analyst
- 3—Surgeon in charge hospital unit
- 4—First Aid captain and crew
- 5—Assistant to chief in charge of information bureau for press, coroner, state officials and cooperating agencies
- 6—Local undertaker in charge of morgue
- 7—Supply clerk for fire fighting supplies
- 8—Time keeper and checker
- 9—Local chief of police (Fan, Water, Public)
- 10—Chief Red Cross official.

## ELECTRIC DUST PRECIPITATORS

THE removal of dust with electrical devices has been practiced on a large scale in German cement and metallurgical plants for many years, according to C. P. White, chief, Coal Division, United States Department of Commerce. Recently the same methods have been applied for removing dust in lignite coal briquetting plants.

Formerly the lignite industry removed such dust either mechanically or with water. As most lignite briquet plants are located in exceedingly dry districts, it is often difficult to provide enough water for the cleaning machines.

The basic principle of the electrical cleaning process is as follows:

The air in which the dust floats is conducted at moderate speed past a number of electrodes of different polarity. The dust particles are electrically charged, repelled, and fall into a conveyor mechanism. The dust collected in this manner is pressed into briquets. In a particular lignite drying plant of average size about 200 kilos of lignite dust are recovered per hour, which corresponds to approximately 8 percent of the total factory output.

Direct current at from 30,000 to 250,000 volts pressure is needed. The current consumption is very low and amounts to approximately 0.7 kilowatts for an air volume of 300 cubic meters per minute.

## TEACHING SAFETY

A N illustrated safe practice pamphlet dealing with "Teaching Safety to New Employees," has recently been published by the National Safety Council. The pamphlet is non-technical in reading matter and is the combined experience of the industrial members of the Council. It is edited by 75 safety engineers who form a volunteer committee for such work.

"One of the most important considerations of industrial management is the introduction of the new employees into the plant," reads the introduction. Statistics show that the new employee is more liable to injury than one who has seen long service.

"Accidents to new employees are due not so much to carelessness or thoughtlessness as to lack of familiarity with the hazards and working conditions. Another factor is nervousness due to a desire to equal the production or speed of the more experienced workmen. Mechanical safeguards in specific industries may, to a certain extent, prevent accidents from both of those causes. The greater number of accidents, however, occur from causes that are not preventable by guards. Education and super-

vision are the only effective methods of attack for such accidents.

Inquiries regarding this pamphlet should be addressed to the National Safety Council, 168 North Michigan Avenue, Chicago.

## PROGRESS IN STANDARDIZED COAL MINING

(Continued from page 157)

### FEDERAL INTEREST IN STANDARDIZATION

It may not be out of place in closing to note the interest which is being shown by various branches of our National Government in standardization. During the past year the writer has visited Washington several times and on each visit has taken occasion to confer with various governmental officials in charge of standardizing products and equipment for their respective branches of the federal service.

The Federal Specification Board has now been functioning for a considerable time, and is making very material progress in unifying as well as improving the specifications produced by the various governmental departments. This board acts on behalf of the National Government, somewhat the same as the American Engineering Standards Committee acts on behalf of our interests, and the result of its work cannot help but be of very great value in reducing the enormous expense required to carry on our National Government.

The Department of Commerce, through its Division of Simplified Practice, which is the first step in standardization, has rendered a great service to the nation in calling and directing conferences of industries and in cooperating with such industry in reducing the number of sizes and types of projects which such industries produce. That economies resulting from such simplification in manufacturing are almost beyond belief, is testified by leading men in many industries.

Various other governmental departments maintain a bureau devoted to standardization, and are very active in carrying forward this movement of standardization of materials and equipment used by them.

On my last visit to Washington, I was advised by the heads of some of our largest federal departments that they had made very material progress in the adoption of standard specifications for all their requirements, and that wherever they had introduced standards it had very materially reduced the cost of purchasing standardized materials and equipment.

The publication of the reports of our committees in a loose-leaf handbook marks a further step forward in our work, and it is anticipated that 1925 will see greater progress than any of the previous five years.

# THE ECONOMY OF PRESERVING MINE TIMBERS

*It Is The Opinion Of The Majority Of Operators That The Timbers In Shafts And Shaft Stations Should Be Treated, But In Spite Of This Agreement Few Metal Mines Treat Their Timbers—That It Will Pay Is Clearly Brought Out In This Article*

By GERALD SHERMAN\*

GREAT efforts are now being made to reduce the quantity and cost of the timber used in mining. Methods of mining are selected that require less timber, either by avoiding the support of ground by timbers or by treating them as temporary supports only, which are to be abandoned in a few days or weeks before the full weight of the ground crushes them or decay destroys them. Thus, in the first case, little timber is used, and, in the second, smaller timbers and poorer varieties successfully employed.

In any mine, however, there are chambers and thoroughfares that must be maintained more or less permanently in ground that requires support. In ground that is not too much broken, the use of gunitite is becoming general, and the use of steel or concrete for more severe service is increasing, but timber still remains the material in most general use and is usually the cheapest in first cost. In fact, steel or concrete are often so much more costly that timber, allowing for replacements, may be still the cheapest support, although its life may be limited by crushing or decay.

Its failure by crushing can not be avoided, but decay can be postponed by treatment with preservatives. The remedy by such treatment is obvious, but the knowledge of the subject is, at this time, rather indefinite, and operators hesitate to spend money in timber treatment without being positive of making an ultimate saving. It is quite simple, by assuming the life of timber underground and estimating the cost of treatment and replacement, to determine whether it is profitable or not. Unfortunately, the life of timber varies so

much in different mines and in different parts of the same mine, that this most important factor of the equation is extremely difficult to estimate.

Illustrations of the difference in life of timber underground may be taken from records of the Copper Queen Mine of the Phelps Dodge Corporation at Bisbee, Arizona.

The Gardner Shaft was timbered with a good quality of so-called Oregon pine in the latter part of 1903 and early part of 1904. Since that time no shaft sets and but little lagging have been replaced. The timber is in good condition, and the majority of it would, under similar circumstances, last much longer.

The Calumet and Cochise shaft was enlarged and retimbered with new Oregon pine timber in 1918 and 1919, to the 1000 level, and later sunk 800 feet deeper.

It has been recently necessary to retimber the upper part of one compartment of this shaft for a distance of 450 feet. This is the upcast compartment. All end plates, dividers and lagging are being replaced. The wall plates are rotten and the decay extends occasionally from six to ten inches into the next compartment. The timbering of the other two compartments is in good condition.

The Sunrise shaft, 723 feet deep, was completed in 1921. In November, 1922, it was necessary to replace the lagging in the upper 500 feet of the shaft. It has not yet been necessary to replace heavy shaft timbers, but in the upper 400 feet they are beginning to decay and replacements will soon be necessary. Fresh air through a tunnel reaches the bottom of the shaft directly. Air which

has been warmed and moistened by passing through stopes, reaches the shaft in considerable volume 300 to 400 feet below the collar.

Drift timbers on the 800 level of the Sacramento Division decay very rapidly. Their life will be about two years.

In these cases, the explanation is rather simple. The air in the southwestern part of the United States is generally dry. Timber in downcast shafts or in parts of the mine through which fresh air passes directly, has an indefinite life. Timber exposed to air that has been warmed and humidified by passing through underground workings decays rapidly, its rate depending upon the condition of the air, the character of the timber, etc.

We may say that timber treatment in the former case is unnecessary. However true this may be, mining conditions change. The Gardner Shaft is now an upcast and more rapid deterioration of the timbers has begun.

At the Burro Mountain Branch of Phelps Dodge Corporation at Tyrone, New Mexico, the Niagara Tunnel was timbered in 1913 and 1914. This tunnel is an incast part of the ventilation system and the majority of each set is in excellent condition today. The sides and top of the tunnel are dry, but the floor is damp. The bottoms of many of the posts have decayed and it has been necessary to cut them off and set them on new blocks. In the end of the tunnel, the ground is very heavy and timber failure is by crushing rather than decay.

The cost of replacing a shaft set is high, and the interruption to the shaft service may be a serious matter. Under conditions prevailing in Arizona, it is estimated that the complete replacement of a shaft set, with lagging, in a three-

\*Consulting Engineer, Douglas, Arizona.

	Mine No. 1		Mine No. 2		Mine No. 3		Mine No. 4	
	January, 1925		January, 1925		January, 1925		Year 1924	
Tons mined.....	38,011		31,516		67,878		.....	
Feet B. M. of timber used per ton...	19.95		13.6		6.6		.....	
Purpose	Timber used	Timber that should be treated	Timber used	Timber that should be treated	Timber used	Timber that should be treated	Timber used	Timber that should be treated
Stopping.....	496,943	.....	261,672	.....	347,072	.....	6,500,342	11,226
Development or exploration.....	173,637	52,837	128,984	75,000	26,627	13,313	1,111,806	1,111,806
Track ties and haulage timbering...	6,581	6,581	*	.....	17,792	10,000	*	.....
Shafts, etc.....	12,271	12,271	4,501	4,501	9,826	9,826	.....	.....
Drainage.....	.....	.....	500	500	1,641	1,641	.....	.....
Repairs.....	68,867	20,661	33,615	8,202	44,472	11,118	646,796	120,966
Miscellaneous.....	.....	.....	.....	.....	764	.....	.....	.....
Total.....	758,299	92,350	429,272	88,203	448,194	45,898	8,258,944	1,243,998
Proportion that should be treated...	12.5%		20.5%		10.2%		15%	

\* Track ties and haulage timbering are in development and exploration column.

compartment shaft, would cost \$90.00 to \$100.00. One thousand and seventy feet of timber would be used, costing, framed, with blocks and wedges, \$50.00. The labor would range from \$40.00 to \$50.00, depending upon shaft conditions. Thorough treatment of this timber would cost from \$26.00 to \$34.00. If dipped or steeped, the cost would be \$10.00 or less.

There is a general agreement among operators that in all mines a certain proportion of the timber should be treated. In order to ascertain what proportion this may be, information has been furnished by several mining companies, which has been collected into the following statement. It is intended to be illustrative and is not presented as a complete review of mining conditions. In most cases, the proportion to be treated is a matter of judgment and probably not founded on definite information.

It is the opinion of the majority of operators that the timber in shafts and shaft stations should be treated. Track ties should be treated and the timbers in certain thoroughfares, or parts of them, should be preserved. Pump station timbers, or those supporting other permanent chambers, should also be treated unless there is a probability that they may be crushed before they decay.

The representative of another company reported that they did not believe that timber treatment would pay. This company is using cedar in places where ordinary timbers decay rapidly. In Mine No. 3, a shaft is timbered with redwood. Such practice is for the same purpose as timber treatment and may be equally successful or more so.

The proportion of the timber consumed, that it is advisable to treat, is not very large, only from 10 percent to 20 percent. However, it would amount to nearly 4,000,000 feet per year at the four mines from which data was obtained.

Although there is a pretty general agreement on essential points, the fact remains that, in the metal mines of the West, with the exception of the Anaconda Copper Mining Company, the use of treated timbers is not common even for work in which many operators feel that there should be beneficial results.

The reasons for this lack of progress is the absence of conveniently situated treating plants, the cost of treatment and finally, the uncertainty of its value in the particular situations that may be under consideration. There are no custom treating plants in Arizona or New Mexico. It can not be positively stated that there are none in Southern California that handle timber for general commercial use, but this was the case a short time ago. Since timber should be framed before treatment, the practical obstacle to obtaining thoroughly treated

timber, even for experiment, can be easily recognized.

The cost of treatment varies with the character of the preservative and the quantity that is absorbed. Various preservatives in general use have been described by Mr. Geo. M. Hunt, in charge of the Section of Wood Preservation of the Forest Products Laboratory at Madison, Wisconsin, in publications of the Forest Service, and reports of committees of the American Mining Congress, etc. Each has advantages.

The preservatives may be divided into two classes, the coal tar and creosote derivatives, and mineral compounds such as zinc chloride, sodium fluoride, mercuric chloride, etc.

Those in the first class are not soluble in water and are therefore particularly suitable for use in damp or wet places. As timber preservatives they are not excelled by any, but they have the disadvantage of being rather objectionable to handle and of increasing the fire risk. Both of these characteristics are considerably reduced by storage for a month or two after treatment.

The second class are generally soluble in water and may therefore be leached out of the timber in wet places. They are generally cheaper, reduce, or at any rate do not increase, the inflammability of timber and are well adapted to use in dry situations.

The treatment may be in open tanks, in which the timber is left to soak, or it may be treated in closed pressure and vacuum tanks, by which the penetration, and the life of the timber is considerably increased, but the expense is greater.

It is not possible to give accurate figures for treatment costs, because they vary so much in different situations. Recent informal quotations by a large commercial plant in the Northwest, give the cost of treating timber with No. 1 Creosote Oil at \$21.25 per thousand for six pounds of oil per cubic foot, and \$24.25 and \$27.25 per thousand for injections of eight and ten pounds of oil per cubic foot, respectively. The timber treated by such an expensive process should be better than the average mining grade in order to insure its fair resistance to crushing in service. Such timber would cost about \$35.00 to \$40.00 per thousand delivered at railway points in Arizona. Timber of ordinary mining grade costs on the cars at Arizona points \$30.00 per thousand, more or less.

Treatment by zinc chloride, which is probably the most commonly used preservative, would be less.

The value of the open tank treatment is less in increased timber life, but its cost is much less also than the closed tank process, and the cost of a plant is low enough to make it possible for many mining companies to put one in for private use.

The joint report of the Committees on Timber Preservation of the Coal and Metal Mine Branches of the American Mining Congress, which was prepared for its Twenty-seventh Annual Convention, gives data on costs and estimated benefits of timber treatment by several mining companies in the eastern and central parts of the United States.

Mr. J. L. Hyde, in his description of the Athens mine treating plant, in the same paper, gives its cost at \$1,500.00, being constructed largely of material on hand. Its capacity is about 1,200 feet B. M. per charge and the timber is soaked for four hours in 4½ percent zinc chloride solution at 160° F., and four hours in cold solution afterward. The cost is from \$5.00 to \$7.00 per thousand board feet treated.

Mr. Roy Marks, in a paper presented before the American Mining Congress, gives figures on the cost and value of open tank treatment by Ac-Zol at the United Verde Extension Mining Company in Jerome, Arizona.

A rule of thumb formula given by Mr. Geo. M. Hunt, specifies that the time of treatment should be one day for each inch in thickness of the timber treated, plus one day additional. A plant with a capacity of approximately 40,000 feet per month of assorted sizes of timber, such as would ordinarily be used in a mine, would require about 1,200 cubic feet of capacity. Its cost, with storage tank, pump, tracks, etc., would be from \$3,500 to \$4,500.

The treatment at the United Verde Extension mine and the Athens mine yielded good results. The longer treatment referred to by Mr. Hunt would cost more for plant and a little more for treatment, but should give better results.

The Anaconda Copper Mining Company has a small treating plant at Rocker where they treat timbers for their own use and for a limited number of customers beside. Both closed and open tank treatment can be used, or any preservative.

It is probable that a small plant of similar kind would pay if situated in a district where a great deal of timber is used by mines in the immediate vicinity, or even for a single mine which uses great quantities of timber.

In July, 1924, such a plant having a capacity of 2,000 board feet per charge would have cost about \$12,000 f.o.b. factory, or one with a capacity of 4,000 board feet per charge about \$16,000. The capacity per 24 hours when treating seasoned pine would be from eight to ten charges in either. In such a small plant the cost of treatment is necessarily higher and would amount to about \$27 per thousand feet, board measure, for 6 pounds of creosote per cubic foot, or \$32 for an 8-pound treatment.

The growing (Continued on page 165)

## STANDARDIZATION OF DRILL STEEL

*A Special Committee Has Been Studying The Subject Of Standardizing Drill Steel, and This Article Presents Some Of The Conclusions Reached By It*

By FRANK AYER\*

A SPECIAL committee, acting as a subcommittee of the General Section of the Standardization Division of the American Mining Congress, devoted to drilling machines and drill steel, has been studying the subject of standardizing drill steel and has arrived at certain conclusions of importance and benefit to the industry.

The membership of this special committee is as follows:

Ocha Potter, superintendent, Superior Division, Calumet and Hecla Mining Company, Houghton, Mich.; A. S. Uhler, Ingersoll-Rand Company, New York, N. Y.; Geo. A. Shaw, efficiency engineer, Denver Rock Drill Mfg. Co., Denver, Colo.; O. J. Egleson, manager, U. S. Smelting, Ref. and Mining Co., Kennett, Calif.; E. G. Deane, general manager, Superior and Boston Copper Co., Copper Hill, Ariz.; Norman B. Braly, general manager, North Butte Mining Company, Butte, Mont.; Charles Officer, Sullivan Machinery Company, Chicago, Ill.; Bruce Yates, general manager, Homestake Mining Company, Lead, S. Dak.; C. S. Elayer, Clouderoft, N. Mex.; Henry S. Fötter, 26 Cullinan Building, Main Street, Johannesburg, Transvaal, South Africa.

Due to lack of time, it has been impossible to submit the information gathered to each member of the committee and get his definite recommendations regarding sizes or shapes of steel upon which the industry can standardize. This will be done in the near future. Questionnaires have been sent to several companies in the Southwest, and in looking over the answers we find that marked progress has been made by many companies in reducing the number of sections and sizes of drill steel.

The following are the more important points brought out in the replies to the different questionnaires:

1. All companies except one (which uses a 1/8-inch interval) are using a

\* Manager, Mochizuma Copper Co. Chairman, Committee on Drilling Machines and Drill Steel, American Mining Congress.

1/16-inch interval of bit diameter change.

2. One company has tried to use a 1/32-inch bit change interval and reports that it was not practicable.

3. All companies have done away with, or are planning to do away with, dry machines and solid sections of steel. (They state that sprays are ineffective and unsuccessful.) This change is bound to have a beneficial effect upon the health of the miners.

4. Lugged and collared steel breakage excessive with hand-rotated stopers but with self-rotated stopers breakage not

uses, two companies have chosen 1-inch round hollow and one company has chosen 7/8-inch quarter octagon hollow.

10. Companies having exceedingly hard rock and companies drilling very long holes (over 10 feet) have in most every case stated that a heavy steel is necessary. They have chosen in all cases 1 1/4-inch round hollow as their heavy steel and either 7/8-inch quarter octagon hollow or 1-inch round hollow as a lighter steel for softer ground.

11. The most interesting point brought out was the fact that only three kinds of steel will take care of all the companies' requirements when they have completed their standardization program.

These are: 1 1/4-inch round hollow, 1-inch round hollow, 7/8-inch quarter octagon.

This shows that a great deal has been done by most companies in the Southwest toward standardization. It is always certain that each one of the above-mentioned sections has very marked advantages for certain kinds of work, and it is doubtful if any one of these sizes or sections could be eliminated without seriously affecting the

drilling costs of certain companies. On the other hand, it appears very possible that the mining industry could get together on these three, or not more than four or five, sizes and shapes of steel. If this can be done the steel companies would have fewer sections to roll and keep on hand, which should mean more volume of each kind rolled and lower total stocks of steel kept on hand. These reductions should ultimately be reflected in lower prices of drill steel. During the coming year we will refer this matter to each member of the committee and have his definite recommendation.

A very common statement in the questionnaires was that different companies intend to standardize on one or two sections of steel "as soon as present stocks in their mines and supply departments are exhausted."

Standardizing on one or two sections



New Pilares shaft, shops, hoist house and Diesel compression plant at the Mochizuma Copper Company, Pilares de Nacozari, Sonora, Mexico.

serious. Tendency toward use of more self-rotated stopers.

5. Everyone agrees that the fewer sections the lower the total cost of steel, steel handling, and steel sharpening.

6. Although several companies are using from three to five kinds of steel, all agree that they can, and eventually will, standardize on only two kinds, and three companies have decided to standardize on only one kind.

7. The sections and sizes most companies are willing to eliminate are: 1-inch cruciform solid, 1 1/4-inch cruciform solid, 1 1/8-inch round hollow, 1 1/8-inch hexagon hollow, 1-inch hexagon hollow, and 7/8-inch hexagon hollow.

8. Several companies using both 7/8-inch quarter octagon hollow and 7/8-inch hexagon hollow state that they could drop the 7/8-inch hexagon hollow.

9. Of the three companies which have decided on only one kind of steel for all



## DETERMINING SIZE AND SHAPE OF DRIFTS AND DRIFT TIMBERS

*No General Standard Can Be Evolved That Will Be Applicable To All Mines, But Any Economically Managed Mine Must Arrive At A Standard Size For Drifts And Timbers*

By A. C. STODDARD\*

THE subject under discussion is a difficult one, as I realize that there are many metal mines that I have not seen and many ideas that may be at variance with mine.

It may be stated as a fact that a drift should be large enough to handle the mine material economically, and that the size of the timber should be of sufficient strength to make the passageways safe and to hold them open for the movement of the mine material.

Approaching either subject must bring many viewpoints into consideration.

Considering drift sizes first; this brings up the question of the number of haulage levels, the number of tons produced per shift, kind of haulage; and depending on the foregoing is the size of the haulage units and kind of cars.

It is probable that a mine producing 300 tons from five levels per shift, or from one level, could standardize on size of drifts, cars and haulage, but it is possible and extremely probable that such a standardization would be useless for a mine that was producing and hauling to shafts 4,000 to 6,000 tons on one level per shift.

The first case could be taken care of by men, animal or light motor haulage with small cars, but surely the 4,000 or 6,000 ton example could only be taken care of with large motor haulage and large units for the loads. Thus we have at least two sizes of drift in general—one to be small and the other large.

It might be that some of the operators that have mines between the sizes used as examples might wish to consider themselves the ideal, and then these sizes would have to be considered standard. In the small drift, using man or animal haulage, a 5 x 7 feet in the clear drift could be considered standard, but in some of the Western States the height would not be sufficient to use electric haulage and be within the legal requirements, which brings two standards into the small drift class, both of them using the same width but different heights.

These two might be reduced to one if the operator using man or animal haulage would take the chance that eventually his mine might come into the small motor class and plan his drifts accordingly. This anticipation would entail some extra expense, and even considering the future extra costs due to the necessity of enlarging, under difficulties,

his drifts, he might be forced to fit his drifts to present requirements and amount of capital. That would leave us where we were at the beginning with two standard small drift sizes varying as to height.

Considering the sizes and shapes of timber necessary in a drift of this size, the fact is brought home to us that nature did not make all materials under the face of the earth the same. The size of timber that would be necessary for one mine would not do at all for another. In some cases timbers used as drift sets as large as 12 x 12 inches square spaced 3 feet centers would be necessary to hold the ground, while in other cases 4 or 6 inch poles with light caps and lagging would protect passing men and trains from the small amount that would loosen and fall from the back. Certainly between these two examples there are an infinite number of classes and many variations could exist in the same mine. Taking squared timber as a standard for comparison, it could be said that the mine of 300 tons per shift, or even per day, production could find use for 12 x 12s, 10 x 10s, 8 x 8s, 6 x 8s, 4 x 6s, and various thickness plank up to 3 inches, and varying in width from 6 to 12 inches. Round timber would vary as widely.

Standardization surely does not mean using timber too small or too large instead of the right size, if the right size is available. Using too small timber means sacrificing safety and using too large means spending money and timber wastefully, and a mining property usually has to be careful either way.

The remarks here made apply equally well to large drifts, so it is needless to make another point for such drifts.

Considering the size of drift for a mine producing a heavy tonnage from one haulage level, or from two or three levels, to be economical the car units should be large as well as train units, and the gauge of the track must be as wide as possible to permit safe and speedy operation. The width of the drift is determined by these factors and the height is influenced by the type of motive power.

The method of mining and character of material excavated has considerable influence on the type of car. Another thing that influences the type of car is the method chosen for emptying the car at the discharge end of the travel. The

length of the car is influenced by the curvature of the mine tracks. From these points it can be seen that standardization for a large metal car is a difficult thing to accomplish, and the standard size of the drift is considerably dependent on the standardization of the car and motive power.

Motive power for haulage also influences size of drift. As a general rule, trolley locomotives would take a higher drift than compressed-air locomotives, and as far as battery locomotives are concerned, they have not reached a stage of development sufficient to handle large tonnage units economically. These three cover the haulage field, though under certain circumstances gasoline or third rail might be considered. If these were considered, installation and construction of the units would influence the shape of the drifts.

There is no doubt that any mine that is economically managed comes to a standard size of drift, and in general to standard sizes of timber, but all mines cannot and should not come to the same standards.

### ECONOMY OF PRESERVING TIMBERS

(Continued from page 162)

scarcity and increasing price of timber makes it essential that the strictest economy in the use of timber should be observed. We must accept as a fact that it will pay to treat certain proportions of timber used in any mine. The character of the treatment and the places where treated timber should be used will depend upon local conditions, either of the manner in which it is used or of the comparative cost and value of the treatment. All of these factors can be determined. The fact that little accurate information on the subject is available only indicates that such information must be obtained.

It is quite probable that maximum economic benefit would be obtained from open-tank treatment. Fortunately, this is the process which costs least, either for plant or treatment.

Mining companies cannot afford to let this matter go by default. It would be difficult to show why a larger user of timber should not provide a tank treatment plant of appropriate size, at least for experimental purposes.

Thanks are due to the managers of several mining companies and members of their staffs for advice and assistance in the preparation of this paper.

\* Chief Mine Engineer, Inspiration Consolidated Copper Company.

## SHARPENING DRILL STEEL

*Modern Practice Calls For Clean Steel, Special Oil Or Coke Furnaces, Exact Gauging Blocks, And Pyrometer Control For Hardening—The Critical Temperature For Plunging Is About 1400° F.*

**I** WANT to begin by telling the story of my own early experiences sharpening drill steel.

Some 21 years ago another young engineer and myself, both just out of technical school secured a lease on a feldspar and mica deposit, which had not been opened up but from which we thought we could make some money. We were very limited as to capital and just had enough money to purchase a small boiler, a 2½" piston drill, a few bars of drill steel, a little portable forge and an anvil. Our blacksmith shop consisted of the shade of a big tree. Our mining organization consisted of my partner, myself and one good strong wheelbarrow.

The proposition was a thin mineral sheet covered by 8 feet of hard cap rock. The formation was flat and outcropped on a slight hillside so that we had a regular quarrying proposition. One of us would run the drill while the other acted as helper and fireman. The fireman job was no cinch as he had to rustle his own wood and pack water to the boiler in pails.

After drilling a row of holes in the cap rock and blasting we would proceed to muck out the little quarry. This was several days' job and it was a tough job in the broiling hot sun but we did not really mind it because there was another job just ahead of us that we really dreaded, and that was to sharpen the drill steel for the next round of holes.

We were using the old style of straight 14 degree taper cross bits. Our starters were made up to 2½" gauge, and we gauged down by ¼" steps. Our runs per gauge were 18" and the last steel, a 9-foot length, was 1½" gauge. We were using 1¼" dynamite.

Our forge was one of those rivet heating affairs. The fire was very thin and it took a long time to get the steel hot. It also took a lot of heavy sledging to dolly those bits, especially the starters. To save time we got into the bad habit of putting several drills in the fire at once. We did this by arranging them around the forge like the spokes of a wheel. We alternately cranked on the blower until some of the steel was red hot, then selecting a piece, we stopped to work on it. The result was that some of the pieces soaked in the fire an hour or two at a time before we got to them.

It was not long before we began to have cracks in the wings of our bits.

By W. R. WADE\*

This meant the wing would soon break off and then we had a mighty hard job ahead of us, because we had to cut the other three wings off even with the broken one and practically make the bit up new.

Our knowledge of steel sharpening was picked up from a local country blacksmith and I must say we did not go to the right place to pick up much knowledge. What we really learned from that country blacksmith was how to abuse and misuse steel, and make ourselves extra work.

It was an all day job for us to sharpen that steel and we preferred loading broken rock in the pit in the hot sun to the sharpening job.

It struck me that if we could stop our steel from snapping off corners, stop it from getting cracks in it, and make those bits stay sharp longer, it would materially lessen our hard labor.

It is now 20 years since we decided we could not get rich out of that quarry and gave it up, but I have never lost my interest in the business end of a piece of drill steel.

There have been many changes in drilling practice and in rock drills during these 20 years. The speed and power of the modern drill forces the bit through the rock at an unbelievable speed as compared to the old piston drill and that means that the modern bit has got to take many times harder punishment. As a matter of fact although there has been great advancement in the art of making steel and the art of sharpening steel on the job, the designers of rock drills are today being held back for lack of a steel capable of standing up before the drilling speeds they could put into their machines. The mining industry needs a steel capable of doing for rock drilling what the high speed tool steel has done for the machine shop.

The best modern blacksmith shop practice is now generally standardized as follows:

1. The steel coming into the shop from the mine is cleaned and any plug removed from the hole in hollow steel. Bits with mud adhering to them should always have this material cleaned off before putting them in the heating fire. If this mud is from sulphide ore it is especially injurious to the steel to heat it red hot with this sulphurous material on it, as the sulphur is absorbed to some extent by the steel. I believe in wash-

ing every bit in running water as the steel is brought into the shop. This is a point that is overlooked in many shops, but one that deserves careful consideration, and a good deal of trouble can be avoided by observing this practice of having the steel clean before heating.

2. The clean steel is now heated to a bright red preparatory to sharpening with some good make of compressed air operated sharpener. A modern sharpener, by the way, can do more and better work on a bit in 60 seconds than my partner and I could do in 15 minutes.

In the modern shop this heating is generally done in an oil fired furnace, with or without pyrometer control. There has existed in my mind for some time, after wide experience in both big and little shops, a doubt as to whether the oil furnace is superior on this forging heat to a coke fired furnace or not.

The average oil furnace is operated with an oxidizing flame. That is to say, to get complete combustion with the oil and avoid a yellow smoky flame, the endeavor is to burn all the carbon in the fuel to carbon dioxide if possible. In doing this there is generally an excess of air or oxygen introduced into the furnace, more than is taken up by the oil to give complete combustion. I have noted that steel continually heated to the forging heat, say 1600 degrees F., in these oil furnaces is often partly decarbonized, especially at the thin cutting edges and corners of the bit. This prevents the steel later from attaining its proper hardness at these vital points and materially reduces the efficiency of the bit. It makes it dull sooner in service than it should. Therefore, cutting down the average drilling speed, and the miner needs more pieces of sharp steel during the shift. That means more bits for the shop to sharpen.

Regardless of the statement of those responsible for the work in the blacksmith shop that the steel progresses rapidly through the oil furnace and is quickly passed to the sharpener, this is not always true. I know that there are times in the average shop when the steel soaks for long intervals in the fire, due perhaps to various interruptions in the work of the shop. Steel that stays for a long time in an oxidizing atmosphere at temperatures of 1600 to 1700 degrees F., cannot help becoming partly decarbonized especially on the thin edges, and corners.

A properly designed coke furnace has

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a reducing atmosphere. The steel can be left in it for longer intervals without reducing the carbon content at the thin edges. If the air blast is properly regulated there is little danger of excessive temperatures. The steel can be kept in contact with the glowing coke and under conditions that are reducing instead of oxidizing.

The things to look out for at this stage to insure good bits are:

(a) Don't let the steel get any hotter than bright red. Don't under any circumstances let it get white hot even if it is not hot enough to give off sparks or burns as the blacksmith calls it. High carbon drill steel should never be subjected to white heats.

(b) Don't hold the steel at a bright red heat in the fire any longer than is absolutely necessary. Keeping steel bright red in a furnace too long is one cause of cracks in the wings of the bit. Short cracks seem to grow bigger under this abuse. This may be due to some sort of a wedging action caused by the growth of the crystal grain of the steel. Steel grows coarser grained the longer it stays red hot. If steel is held at a bright red heat, especially in an oxidizing atmosphere it will begin to decarbonize on its surface. The longer the steel is held at this temperature the deeper the decarbonization will penetrate.

(c) Don't let the heat run up your steel too far. Steel that is red hot for  $2\frac{1}{2}$ " on jack hammer sizes and 3" on heavy machine steel has an amply long heat for forging in the average sharpener.

3. The bright red bit is now passed to the sharpener. This machine should work fast and make a perfect bit in one heat. Don't work steel after it cools below a dull red. If the modern sharpener can not turn out a sharp bit in one heat there is something wrong with the machine or the operator. The chances are that the air pressure is too low, or the air lines leading to the machine are too small. Nothing smaller than a 2" line should be used right up to the machine and an inch and a quarter hose for the connection. The machine should have 95 to 100 pounds of air right at its throttle, not when it is idle, but when it is operating. A sharpener takes a lot of air and the pressure drops quickly at the machine unless it has a large supply pipe.

The bits should be finished to exact gauge by gauging blocks which are standard equipment on a good sharpener. The double taper bit has replaced the single taper bit in practically all the larger mining centers. This is because it allows of a smaller gauge variation between various lengths and thereby reduces the diameter of the starter necessary to leave a given diameter for the last steel. This means less volume of

rock to cut and an increase in drilling speed. Also this form of bit reams a round hole with the result that the miner has less fitchored holes to fight. The total result is a material increase in the total drilling speed.

With the old style single taper bit the standard gauge variation was  $\frac{1}{4}$ ", whereas with the double taper bit the gauge variation is cut down to one-eighth or one-sixteenth depending on the rock, and in some extreme cases to one thirty second. These double taper bits do not lose gauge rapidly as did the old style single taper bit, and therefore as big a gauge variation is not necessary to insure the next steel following.

#### 4. Hardening the Steel.

After the bit is forged the steel should be allowed to cool off completely before heating for hardening or as it is often miscalled, tempering. Tempering means to draw out part of the hardness.

A great deal of bit breakage can be avoided if this practice is followed.

Heating for hardening can be done in either an oil or coke furnace, but here is where the oil furnace shows a marked superiority. This furnace should be accurately controlled by a pyrometer. The steel should be heated to a dull cherry red on the end only. This heat should not be over  $\frac{1}{2}$ " to  $\frac{3}{4}$ " in length. The temperature for proper hardening is about 1400 to 1425 degrees F., depending on the steel and its carbon content. The pyrometer will probably have to be set 100 degrees hotter than this to insure enough of a heat differential so that the steel will not take too long to heat and the heat run up the steel too far. The proper temperature on the bit is the temperature at which it will not attract a magnet when the temperature is rising. Magnets are used in some shops to determine this critical temperature and often wrongly, because the users do not understand that any temperature above the proper hardening heat the steel is nonmagnetic, so that the magnet does not measure the upper temperatures but only shows when the steel is too cold to harden. If the pyrometer is set to control the upper temperatures so the steel can not get too hot, then the magnet can be used to test the steel to prove that it is hot enough. That is the pyrometer can be used for the upper limits and the magnet for the lower limits.

In practice we have to heat the steel 15 to 25 degrees above the critical temperature to allow for the cooling between the time it leaves the furnace and the time it is plunged into the water.

If the bit becomes too hot never make the mistake of letting it cool down to the proper plunging temperature and then hardening. Steel grows coarsely crystalline rapidly above the critical temperature and as it cools down this crys-

talline structure continues to grow. If a bit is too hot to plunge let it get stone cold and reheat. When steel is heated from cold to the critical temperature there is a sudden change at the critical temperature and the steel becomes fine grained even if coarse grained from previous heating. It is at this fine grained point that we want to plunge steel. This temperature is about 1400 degrees F., for the average steel and is the critical temperature and the temperature at which it first becomes non-magnetic. It is the correct plunging temperature.

It is very difficult to judge the exact red color for proper hardening by the unaided eye. Variations in the light in the shop will cause the judgment of the best trained eye to be badly in error.

A machine called the Comparo-Scope has been placed on the market by the Denver Rock Drill Co., within the last two years and is an enormous help. An electric filament glows at the exact color of the various temperatures wanted. The desired color is obtained by plugging in on the connection marked for that temperature. Thus if we want 1425 degrees F. we plug the connection in on the hole marked 1425. The current is obtained from a lamp socket. We then compare the hot steel for color with the color of the filament and the eye can instantly tell if the steel is too hot or too cold.

Having heated the steel to the correct hardening temperature it should be plunged in water instantly. Here practice differs somewhat. Some shops use shallow running water. This is very bad practice and causes a lot of steel breakage at the water line. Cracks seem to form at the water line and grow with subsequent sharpening until the bit snaps off in the mine.

Other shops use machines which gradually immerse the steel. This arrangement gives good results but is not necessary if the heat is not carried back too far on the steel.

The best practice is a short hardening heat and a direct plunge in deep water.

#### MACHINERY MANUFACTURERS CONFER

**M**ORE than 60 trade and technical organizations and 300 individual firms engaged in machinery manufacture or the production of machined products were invited by the Division of Simplified Practice, Department of Commerce, to attend a conference on March 25 to consider eliminations in the milling cutter industry.

The program as developed by the simplification committee of the industry, after several months of study of demand and variety, called for the elimination of approximately one-third of the varieties now made.

# ADVANTAGES AND DISADVANTAGES OF THE BOOSTER FAN

## *Mr. Williams Qualifies The Uses Of The Booster Fan In Meeting The Problem Of Mine Ventilation, But Gives Numerous Conditions In Which It Is Used Advantageously*

By JOSEPH WILLIAMS\*

I AM aware that I place myself open to criticism in writing this article. The Booster fan is very much used where it should not be used and yet experience has taught us that it can be used to great advantages under certain conditions.

The operator of our low coal seams must produce his product in competition with the operator of higher coal seams. The low coal operator is continually seeking devices by which he may reduce the cost of his production. He recognizes that the State mining law must be complied with. There are conditions under which he resorts to the use of the Booster fan to furnish sufficient quantity of air at the working faces and keep the mine in a healthy condition.

First. Where the surface does not permit of sinking shafts.

Second. Where the airways are so extensive that the enlarging of them becomes too expensive.

Third. Where the water gauge necessary to produce the ventilation has become too high.

The Booster fan has been installed to ventilate the working faces very advantageously under the above conditions.

It is often found that shaft sinking is prohibited by the operator not owning the surface or some other cause.

In extensively developed low coal mines the cost of maintenance and enlarging airways is very costly.

When the necessary pressure to produce sufficient ventilation has become more than two and one-half to three inches w. g. the ventilation at the working faces becomes sluggish and unhealthy because of leakage due to high pressure. When the fan installed on the surface becomes too expensive and fails to produce the air at the working faces he then resorts to the use of a Booster fan.

In consultation with the late C. A. Hughes in regard to the future ventilation of his extensive No. 2 mine, he told me that he had been reading some French mining literature. In it a French mining engineer had advised the use of small fans installed in tandem on the main airways. I did not take kindly to the idea that a 6-foot fan of the surface could produce sufficient ventilation for a large mine where the necessary water gauge was high.

In due time a radical change in the ventilation of this mine had to be made.

The main slope was 11,000 feet to the face, and 2,000 feet from the mouth of the slope a diagonal had been driven a distance of about 9,000 feet from each of these two dips. Entries were driven on either side. Entries on the right side of the diagonal are being driven one to two miles.

To ventilate this section a 4-foot Jeffrey fan was installed as a booster. This fan when put in service produced 45,000 cubic feet per minute in the airway inside the fan and produced sufficient air at the face of three separate splits, which without the aid of the booster would have been impossible.

The volume of air at the inlet increased 16,000 cubic feet per minute and the water gauge decreased one-half inch, which showed that the booster fan was not churning the air or in other words taking the return air into the intake aircourse.

Thus we learned that the additional pressure used placed the air where it was needed and prevented leakage that would be bound to occur if the combined pressure had been made at the fan on the surface.

The large Guibul fan with 45 percent volumetric efficiency is gone and in its place we have the Turbine multiple blade small fan giving two to three times its ratio of capacity.

We must change our formula for finding the efficiency of fans.

First. Where the booster fan is being used disadvantageously. Where it is cheaper to put in an airway a disk fan than build or repair air stoppings.

Second. To ventilate faces of entries allowing the same air to continue circulating through the fan.

Third. Where explosive gas can be detected in the mine.

Fourth. In dry dusty mines.

I can recall one occasion in an extensive mine at one and one-half miles from the bottom of a shaft a 5-foot disk fan was installed in the main aircourse as a booster. There were 30,000 cubic feet per minute passing through this fan and at the shaft outlet there were 12,300 cubic feet per minute passing out of the mine, the only outlet for the air. The Superintendent did as much boosting as the fan. He claimed that he had solved the problem of venti-

lating old and extensive mines. On my arrival at the mine the men were ordered to leave the mine, as the air was heavily charged with C. O<sub>2</sub> (blackdamp).

Fans placed in last crosscut in entries to extend the face undue length between crosscuts when no provision is made to insure that the same air does not reenter the fan.

Where explosive gas is being generated the booster fan should not be used. In case of a disaster the only dependable safeguard at the mine is the fan and it should always be available at the surface.

Secretary of the Interior Work left Washington on March 18, accompanied by Commissioner Mead, of the Bureau of Reclamation, and Director Mather, of the National Park Service, on an official trip to examine into reclamation, national park, and Indian reservation problems.

During the trip irrigation possibilities, flood control, and power development on the lower Colorado River, which has been a subject of investigation for 75 years, will be inspected. Secretary Work and his party will make a short journey into Mexico, examining levees and canals now providing water for the irrigation of the Imperial Valley, and will also look over the site for the proposed all-American canal in Southern California.

The Secretary's itinerary includes two national parks and nine reclamation projects and Indian reservations. The national parks to be visited are the Sequoia National Park and the Yosemite National Park, both located in California.

On the trip to federal reclamation projects, Secretary Work will meet with the water users and settlers, obtaining first-hand information concerning conditions existing on them.

The reappraisal of government reclamation projects, the work of which is now being prosecuted by a special board, will also be checked up.

The projects on the itinerary include: Carlsbad project, in New Mexico; Rio Grande project, in New Mexico-Texas; Yuma and Yuma-Mesa project in Arizona; Klamath project, in California-Oregon; Orland project, in California; Newlands project, in Nevada; Grand Valley project, in Colorado; and Uncompahgre project, in Colorado; and North Platte project, in Nebraska.

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## PAN AMERICAN STANDARDIZATION CONFERENCE

THE organization of some form of a national standardizing body in each of the American Republics was one of the formal proposals of the first official pan-American Conference on standardization recently held in Lima, Peru, according to a report to the American Engineering Standards Committee by Mr. Albert W. Whitney, who served as Chairman of the U. S. Government delegation.

Mr. Whitney reported that standardization is not yet developed in any of the Latin-American countries on an organized basis, and it was the belief of the Conference that the subject would play an important part in the future of these countries, first, in making more efficient and expediting their industrial organization, second, in simplifying and clarifying international trade and third, and most important, the development of better methods of producing and marketing their products.

The recommendations of the conference, which was an official body representing thirteen countries, were made to the Inter-American High Commission and to the twenty-one American Republics represented on it.

The report states that:

"The Pan-American Conference on standardization, held at Lima, Peru, December 23 to January 6, to which I had the honor of being not only your representative, but a delegate of the U. S. Government, was an occasion of great significance. The Conference was held coincidentally with the Pan-American Scientific Congress and immediately following the centario celebration of Peruvian independence. Thirteen American republics sent officially accredited representatives as follows: Brazil, Costa Rica, Cuba, Guatemala, Haiti, Mexico, Nicaragua, Panama, Paraguay, Peru, United States, Uruguay, Venezuela.

"The subject of standardization was received with great interest, and there was a general recognition of the important part that it could play in the future development of the Latin-American States.

"The tangible and formal results of the Conference were the signing of a set of resolutions by the duly accredited representatives which provided for the development and promotion of standardization work by the various countries, and for the development of such work on an international basis. The relation of such work and its development on an international basis was entrusted to the Inter-American High Commission. Provision was made for holding the next

Conference, either two or three years hence, in the United States."

The following is an abstract of the Final Act of the Conference:

It is recommended that the American countries enter into a convention containing the following essential points:

An agreement to provide for continuous study and to secure the establishment of common standards and nomenclature, uniform quality bases, simplified classifications, and standard specifications for raw materials and industrial products.

To carry out this agreement the several countries will bind themselves to establish within their respective jurisdictions, one or more organizations, which may be under the administration of the Government or under private administration, or under administration composed of both governmental and private elements, as may seem best to each of the states signatories of the convention.

The aforesaid organization, whether governmental, private, or mixed, should comply with certain prescriptions and regulations, including the following:

1. The maintenance of an adequate personnel.
2. Measures to obtain adequate cooperation and to consult representatives of all interests and enterprises in their

country, in the establishment of national standards.

3. The obligations of publishing or having published the methods of procedure followed, the results obtained, and any other information which may be of interest.

In order to maintain inter-American communication in this subject and to secure the establishment of inter-American standards, the Inter-American High Commission, through the National section of each country and the Central Executive Council, is charged with the receiving and distributing of information relating to the work done in each country; the Commission will direct or perform such studies as it may believe advisable, will draw up proposals, and will take all necessary measures within its sphere of action to promote the establishment of inter-American standards.

The nations will bind themselves to increase the technical and other personnel of their respective sections of the Inter-American High Commission, if this be necessary, in order that no economic obstacles may be encountered in this work.

It is recommended that there be held a Second Pan American Conference on the Uniformity of Specifications within a period of not more than three years, in the United States of America, and in the city and at the time which the Inter-American High Commission may designate.

## SUPREME COURT SUSTAINS LESSEE DEPLETION ALLOWANCE

*Alworth-Stephens Company Held Entitled To Depletion Allowances For 1917 On Leased Iron Ore Deposits*

IN upholding the decision of the Circuit Court of Appeals, affirming the judgment of the Federal District Court for the District of Minnesota in favor of the Alworth-Stephens Company, a lessee, for recovery of additional taxes paid under protest on account of the disallowance by the Treasury of depletion deductions claimed by the company for 1917, the Supreme Court has made it possible for many other lessee mine operators to recover additional taxes illegally collected by the Government for that year.

The Treasury had insisted that by the extraction of the ore from leased mines, only the property of the fee owner was depleted and such owner was entitled to an allowance therefor. But the Supreme Court, in its decision rendered by Mr. Justice Sutherland holds that, "While the lessee company does not own the ore deposits, its right to

mine and remove the ore and reduce it to possession and ownership is property within the meaning of the general provision. Obviously, as the process goes on, this property interest of the lessee in the mines is lessened from year to year, as the owner's property interest in the same mines is likewise lessened."

All mining lessees, whose claims for depletion allowances for 1917 were denied by the Treasury, may now obtain refunds, provided their rights have been protected and kept alive by waivers or claims for refund. The Tax Division of the American Mining Congress, during 1922 and 1923, gave publicity repeatedly to this matter, and through the columns of this Journal and the Mining Congress bulletin services, warned lessee taxpayers who would benefit by this decision to keep their claims alive. The Treasury is now making preparations to comply with this decision.

## AIR SHAFTS AND AIR WAYS

*"Which Should Be The Larger The Upcast Or Downcast?"—Mr. Walsh Considers Proper Ventilation Of A Coal Mine The Most Essential Thing In Its Operation*

By JOSEPH J. WALSH\*

ONE of the most essential things connected with the operation of a coal mine, from the efficiency and safety points of view, is ventilation.

The different causes that make ventilation necessary are generally known and their relative importance understood. The outstanding cause is "gas," and to that phase of the question this paper will be devoted.

Mines from which a million cubic feet of methane are thrown into the atmosphere each day by the ventilating fans are not uncommon. From the more gaseous mines as much as four to five million cubic feet of this gas are expelled each day. The volume of air required to dilute and render harmless such large volumes of gas is tremendous. In the more gaseous mines it will be found that the weight of the air necessary for this purpose is as much as 15 times greater than the weight of the coal produced; while in a nongaseous mine, if it is properly ventilated, the weight of the air required will be at least equal to that of the coal produced.

Thus it will be seen that while hundreds of millions of tons of coal are passing over the railroad tracks in the mines of the country each year, a far larger number of tons of air are quietly passing through the airways of these same mines. And as it requires the same energy in horsepower to move a ton of air that it does to move a ton of any other substance, it would seem from a power-saving point of view that the airways should be given at least as much attention as the transportation system.

The question is often asked, "Which should be the larger, the upcast or downcast?" And the usual answer is the upcast, because due to the gases evolved in the mine the volume leaving the mine is greater than the volume entering at the intake. The difference, however, is so small that its consideration may be neglected. In one of the most gaseous mines in Pennsylvania the gas liberated each minute is less than 5,000 cubic feet.

Another reason advanced in behalf of the statement that the upcast shaft should be larger than the downcast is that the air entering a mine in the winter time rises

in temperature and consequently increases in volume as it approaches the upcast shaft. This is true, but as the temperature of the air leaving most large mines is the same summer and winter, and as this temperature is so near the average outside yearly temperature, it would seem that there is no practicable reason for the difference in the areas of the intake and return shafts.

*Splitting the Air Volume.*—By splitting is meant dividing the main air current into two or more currents. This may be done near the foot of the downcast or at different points in the mine as required. The advantages of splitting are as follows: (1) A larger volume of air is obtained by the same power; (2) each district or section of the mine is provided with an independent air current, and the return of one section of a mine does not pass through the workings of another section, but is conducted to the main return airway and passes out of the mine; (3) in case of an explosion in one section of a mine the other sections are more or less isolated and are usually not affected by the force or by the gases produced by the explosion.

With constant power, and ignoring the resistance of the shafts, the quantity of air produced will be in proportion to the number of splits, if the current is split near the shaft bottom. This, however, is impossible in practice, because, as the increased volume would have to pass through the shafts, additional power would be required; this statement is made simply to clearly show the advantage of splitting.

*The Practical Limit to Splitting.*—The splitting of an air current may be carried on until the volume of air and its velocity in the last split is just sufficient to ventilate its own particular workings.

While it is impossible to maintain equal splits in practice, an endeavor should be made to approach this condition. Otherwise regulators, which are a source of resistance, will be required.

A regulator introduces a resistance to the free passage of an air current through a district that would otherwise receive too much air at the expense of other districts. The regulator may be placed at the intake or return end of the district, preferably at the intake in a section of a mine in which gas is liberated freely.

If placed on the return end of the split, in cases where a large volume of gas is liberated, it would prevent the free passage of the gas to the fan, thereby creating a dangerous condition. But if placed at the intake, the gas will meet with no interference in its passage to the main return.

It may sometimes be found difficult to construct a regulator in the intake because of its interference with transportation.

The chief means by which large volumes of air may be obtained with the minimum power is large shafts and airways.

An airway having a sectional area of eight feet by eight feet will pass, with the same pressure, twice as much air per minute as an airway six feet by six feet.

In practice airways are not kept free of obstruction throughout their entire length. In the more remote parts of the return airways that are used for ventilating purposes only, obstruction to a greater or less extent as a result of caves exists. Such airways are as a rule without railroad tracks, thus affording no means by which the fallen material can easily be moved to another part of the mine.

The cost of keeping the airways entirely free of obstruction would be prohibitive in many mines. Therefore, the only other alternative is the installation of a fan with sufficient reserve power to overcome this condition.



*The Plaza, Pilares de Nacozari, Sonora, Mexico, where mines of the Moctezumc Copper Company are located.*

\* Secretary of Mines, Pennsylvania Department of Mines, Harrisburg, Pa.

## NEW ANTHRACITE STANDARDS ESTABLISHED

*Recommended By Operators' Conference To Bring About Uniform Sizing And Preparation And To Eliminate Sub-standard Coal*

WITH a view to establishing more definite standards for the sizing and preparation of anthracite, the Anthracite Operators' Conference has recommended to the industry that the following standards be adopted by all producers effective April 1st:

"Broken": Coal which passes through a round mesh 4-7/16 inch and will not pass through a mesh 3-7/16 inch.

"Egg": Coal which passes through a round mesh 3-7/16 inch and will not pass through a mesh 2-8/16 inch.

"Stove": Coal which passes through a round mesh 2-8/16 inch and will not pass through a mesh 1-9/16 inch.

"Chestnut": Coal which passes through a round mesh 1-9/16 inch and will not pass through a mesh 11/16 inch.

"Pea": Coal which passes through a round mesh 11/16 inch and will not pass through a mesh 8/16 inch.

While the above screens are to be used for testing purposes at the breaker, it is recognized that to provide for differences in the fracture of coal, the screens used in the breaker must be varied so as to permit the preparation of coal to conform to the standards contemplated by the use of the testing meshes.

While the new chestnut made in accordance with the above standards of sizing contains an increased percentage of large pea—as compared to the chestnut produced years ago—it has been demonstrated by practical test that its fuel value is equal to, if not greater than, the old standard. The remaining pea coal will be more uniform in size.

It is also recommended that the maximum of undersize coal shall not be more than 15 percent, with the proviso that in the case of chestnut only an additional 5 percent shall be allowed for unavoidable breakage.

Permissible percentages of bone or slate range from 2 to 7½ percent, depending upon size of the coal, it being impossible, even with the utmost care in preparation, to exclude all impurities.

In making this announcement Mr. Samuel D. Warriner, Chairman of the Anthracite Operators' Conference, said:

"Emergency measures adopted during the war and in periods of scarcity following the war have resulted in more

or less diversity in sizing and in preparation as between different operators, and our objective at the present time is to overcome this variance.

"While it may seem to be a very simple matter to set up rigid standards and regulations for the sizing of coal, many difficulties have been encountered owing to the fact that coal in the different collieries does not fracture in exactly the same way or to the same extent. Different coals prepared with identical screens result in a different appearance in product. The aim is to arrive at uniform standards and to eliminate sub-standard products.

"Aside from this, the principal effect of the action taken will be to cut down the tonnage of pea coal and to that extent to eliminate as far as possible one of the sizes of anthracite for which demand has decreased owing to improvement in heating devices, and increase the supply of chestnut which has been inadequate.

"It is the intention of the Conference to advise retailers and the public of the recommendation of these standards, with the purpose of inviting the widest cooperation in their maintenance by all elements in the industry. It is believed that the users of anthracite will be better served by adoption of these new standards."—(Reprinted from The Burning Question, Published by Anthracite Operators' Conference).

### SIMON GUGGENHEIM MAKES \$3,000,000 ENDOWMENT

FORMER United States Senator Simon Guggenheim of Colorado, President of the American Smelting and Refining Company, who has extensive mining interests in the United States, Alaska, Mexico, South America, Asia and Africa, has established the John Simon Guggenheim Foundation, with a gift of \$3,000,000 as an endowment for research study abroad by 50 worthy American men and women. The purpose of the gift, as announced by Mr. and Mrs. Guggenheim, is "to improve the quality of education and the practice of the arts and professions in the United States, to foster research, and to provide for the cause of better international understanding." The endowment was established in memory of their late son, John Simon Guggenheim, who died in 1922 while preparing to enter Harvard University. The fellowships under this endowment,

which will be similar to those established by Cecil Rhodes, provide for their bestowal upon men or women, married or unmarried, of any race, color or creed. The fellowship carries \$2,500 per year for each person upon whom it may be bestowed, which sum may be increased or decreased according to the individual need of the student. The term of the fellowship will be for one year, although it may be increased to three years or decreased to a few months. Beneficiaries of the fellowship will not be restricted as to age, but they must be old enough to have shown marked ability in their particular subject, and it is expected they will be chosen from persons between 25 and 35 years of age.

### AWARDS BEGIN NEXT YEAR

The first national award of fellowship will be for the school year 1926-27, and candidates will be appointed from those who have begun some important work and who show exceptional aptitude for research or who demonstrate ability in some of the fine arts. There will be no restriction as to the subjects to be studied or the place where the study will be pursued under the fellowships. A group of leading American educators has worked out the details of the operation of the scholarships offered by Mr. Guggenheim which provide that those receiving its benefits shall make available to the public the results of their studies, which may cover the workings of foreign systems of government and social or business conditions.

### TO ADVANCE EDUCATION

In discussing the reasons which prompted him to make this important contribution to the advancement of learning, Mr. Guggenheim said that often some of the finest minds and the most constructive thinkers are handicapped in making their natural gifts contribute to the best advantage of the world, by reason of lack of adequate financial assistance. "The income of the Foundation will be spent on men and not on materials," said Mr. Guggenheim. "It has always been easy for educational enterprises to secure money for building, but money for individuals as proposed by this Foundation is apparently hard to get. When a man finishes college and prepares to conduct valuable research he is compelled to spend his whole time in teaching, where salaries are small, and he often loses the impulse for creative work in his subject. Educational systems of Europe are superior to ours, in that they offer greater opportunities to young men to become and remain productive scholars. I hope this Foundation will do something to provide a similar opportunity for young men and women in the United States and increase the vitality and effectiveness of American education."

## SENATE REVENUE INVESTIGATORS ASSAIL COPPER AND SILVER VALUATIONS

*Couzens Committee Agents Allege Mine Valuations Fixed By Income Tax Unit For Depletion Purposes Are Excessive And Deprive Government Of \$50,000,000 In Taxes For Years 1917 and 1918—Revaluation Plan Favored By Committee*

**A**GENTS of the Senate Select Committee on Investigation of the Bureau of Internal Revenue have estimated that the copper and silver mining companies of the United States owe the Federal Government approximately \$50,000,000 in back taxes for the years 1917 and 1918. This was revealed when the testimony taken by the committee in secret sessions during the last three months was made public following the action of the Senate in granting the committee only 90 days additional time from March 1, within which to complete the investigation.

L. C. Manson, special counsel for the committee, in his report to the committee stated that an examination of the returns of 54 copper and silver mining companies for the year 1918 showed that ore in the ground had been over-valued by many millions. He alleged that by reason of these excessive valuations the Treasury has sustained an annual tax loss of \$5,127,096 for 1919 and subsequent years. Lax administration is charged in the testimony with responsibility for these alleged over-valuations and the consequent annual tax loss. The committee's counsel, Mr. Manson, believes that the revaluation plan proposed by the Income Tax Unit for the year 1919 and subsequent years, which has resulted during the last few months in a general revision of the mine valuations as of March 1, 1913, of most of the copper companies, should be applied also to the years 1917 and 1918, the years in which it is alleged the greatest tax losses occurred.

### SILVER REVALUATION

The testimony of the committee agents in reference to the valuations of silver mining companies showed that Commissioner of Internal Revenue David H. Blair issued an order on April 11, 1924, excepting the silver mines from the provisions of the revaluation plan approved December 11, 1922, for both silver and copper mining companies. According to Special Attorney Manson, an official of the Metals Valuation Section believed that this order would mean the loss of considerable revenue and, therefore, on June 18, 1924, in a memorandum to the Commissioner, an appeal was made by this official for this order to be set aside.

It was charged in the testimony that this memorandum apparently never reached the Commissioner, although it was found in the Commissioner's files.

By MCKINLEY W. KRIEGH

The inference that apparently was intended to be conveyed from this testimony was that this memorandum was suppressed by some official or officials without being brought to the Commissioner's attention. It was testified, however, that the memorandum was routed to the Commissioner's office through the regular official channels.

The contention of the Metals Valuation Section that the original valuations fixed by that section as of March 1, 1913, was provisional and not final, evidently is concurred in by the agents of the Senate committee, including Mr. Manson, its counsel. It appears from the testimony that the investigators hold the view that the basic valuations of both silver and copper companies should be revised, not only for purposes of depletion for 1919 and subsequent years but also for the years 1917 and 1918, which the Treasury Department decided in 1922 should be permitted to stand since it appeared that the copper and silver mining companies had paid a fair amount of taxes for those years.

### THE ANACONDA CASE

In connection with the charges made in the testimony that the Anaconda Copper Mining Company had been allowed excessive valuations on its properties, John D. Ryan, chairman of the board of that company, issued a statement which indicates that the charges of the investigators against that company have little or no basis in fact. This statement follows:

"The statement reported as to the testimony presented to the Couzens committee on the valuations claimed and taxes paid by the Anaconda Copper Mining Company and the Inspiration Consolidated Copper Company is so misleading and inaccurate that it would convey an entirely wrong impression to the minds of the reading public if not answered by competent testimony.

"It is stated that while the Anaconda Company claimed a valuation of \$188,713,192 in its tax returns for 1917 and 1918, the amount as calculated by the Chief of the Metals Valuation Section of the Internal Revenue Bureau should have been \$54,865,832.

### THE ANACONDA'S ANSWER

"The Anaconda Company returned as taxable income before depletion for the

three years of 1916-17-18 \$108,746,488 and, after deducting depletion, returned as taxable net income on which it has paid its taxes \$76,654,418. In other words, the Anaconda Company returned as taxable net income in three years 150 percent of the amount the Chief of Metals Valuation Section now says the ore bodies were worth on March 1, 1913. The Anaconda Company paid in dividends from 1913 to date \$111,503,125, or considerable more than twice the valuation of the property on March 1, 1913, according to this testimony.

"During the years 1911-12-13, the three years considered as typical pre-war years by the Treasury Department, the Anaconda Company earned \$35,223,552, or \$11,741,184 per year. In other words, the earnings for five years at this rate would exceed the valuation as of March 1, 1913, now proposed by the Chief of the Metals Valuation Section.

"In the case of the Inspiration Company, in which the valuation, according to the testimony of the Chief of the Metals Valuation Section, should have been only \$17,292,074, that company returned as taxable income before depletion in the three years 1916-17-18, \$46,624,229, and after depletion, \$33,961,288, or about twice as much taxable income returned in three years as the valuation now put upon the ore body in this testimony, notwithstanding that there was over 25 years' supply of ore definitely proven and blocked out in the mine at the date of valuation. The Inspiration Company has paid in dividends from 1916 to date \$41,347,635, or two and one-half times the amount the Chief of the Metals Valuation Section says is the value as fixed by him for the property on March 1, 1913.

### PROPOSED REVALUATION ABSURD

"These figures are accurate and can be proven from the tax returns made by the companies to the Government and the official records of the company, and show conclusively that these companies reported taxable net income in accordance with the law and the regulations of the Treasury and that the valuations now proposed by the Chief of the Metals Valuation Section are absurd and will not stand before any fair-minded appeal body or court.

"The valuations of the properties used in the tax returns made by the companies were arrived at after exhaustive study by the Bureau of Internal Revenue

nue and have been verified and approved by the bureau under two administrations."

In view of the facts set forth in the foregoing statement by Mr. Ryan, the following paragraph quoted from the original valuation plan of December 11, 1922, as proposed by the Income Tax Unit, is exceedingly interesting:

#### INCONSISTENT ATTITUDE SHOWN

"That all valuation by analytic appraisal methods, based upon estimates of any factors such as operating cost, grade of ore, quantity of ore or increased rates of production, be provisional until actual operations by the taxpayer have demonstrated the essential accuracy of his estimates; in other words, that information derived from operations subsequent to the required basic date will be the test of the accuracy of analytic valuations which must be based upon estimates."

It has been the policy and practice of the Department in determining valuations of mines, to take into consideration only such evidence of value as existed at or about the basic date. In other words, the Department has considered evidence of earnings, sales, development, costs, grades of ore, and other factors developed prior to March 1, 1913, but has given little, if any, consideration to any material factors disclosed from subsequent history of mining operations. Therefore, the recommendation quoted above appears to be inconsistent with the Treasury's practice, unless it means that the department intends to consider valuations in the light of subsequent history when that history is unfavorable to the taxpayer. However, the policy embodied in this recommendation appears not to have been followed in the case of the Anaconda.

#### JEOPARDY ASSESSMENTS

Official notice of the proposed revaluation of silver properties was forwarded to the silver companies on or about February 15. Waiver forms accompanied each notice. The companies were threatened with jeopardy assessments unless the waivers were returned to the Department within two weeks from the date of the notice. The following is said to be a sample of the notice sent out:

"On December 11, 1922, the Commissioner of Internal Revenue and the Secretary of the Treasury authorized and directed the Income Tax Unit to revalue silver mines on a basis consistent with that used in the valuation of other metal mining properties. Such revaluation applies to all returns for 1919 and later years unless written agreements have been made with the Commissioner under the provision of Section 1312 of the Revenue Act of 1921 or Section 1006 of the Revenue Act of 1924.

"Inasmuch as the silver mining companies were not accorded a hearing prior to the issuance of this order, it is deemed advisable to give representatives of the companies an opportunity to be heard before a general revaluation of the silver properties is made. You will be advised promptly of the time and place for you to appear.

"To give you sufficient opportunity to make such a showing as you may desire in this connection and to protect the Government's interests against the running of the statute of limitations, request is made that you execute the attached waiver consenting to the assessment of any additional tax that may be found due in accordance with Section 278 of the Revenue Act of 1924. This waiver should be returned to this office within two weeks from the date of this letter.

#### WAIVERS DEMANDED

"In the event you decide not to file a waiver it will be greatly appreciated if you will notify this office to that effect. If waiver is not filed it may be necessary to make a jeopardy assessment as provided for by Section 274 (d) of the Revenue Act of 1924. Should a jeopardy assessment be made the Collector of Internal Revenue for your district will accept a claim in abatement when supported by a sufficient bond to cover the amount of the assessment.

"Your reply should be addressed to the Commissioner of Internal Revenue, Washington, D. C., for the attention of IT:EN:M:JAG. Respectfully, J. G. BRIGHT, Deputy Commissioner. By John Alden Grimes, Chief of Section."

It is understood that several of the western companies submitted waivers in accordance with this letter and that these waivers reached the department within the time limit of two weeks; but that the department did not wait until the last day granted in the letter, so that when the waivers arrived it was found that the threatened jeopardy assessments already had been placed on the assessment lists and forwarded to the collectors of the several districts in which the several mining companies were operating. It is not known whether or not the department has withdrawn these assessments in view of the fact that the waivers were filed, but it is supposed that many companies will be forced to meet these jeopardy assessments, without having a hearing, notwithstanding the fact that the letter was complied with in good faith.

#### ORIGINAL VALUATION SHOULD STAND

The department proposes to revise the original valuations for purposes of depletion allowances for 1919 and subsequent years. Original valuations are permitted to stand for 1917 and 1918. In effect, therefore, the department says

that on March 1, 1913, valuation on a mining property is proper for one year, but a different valuation as of March 1, 1913, should apply for a subsequent year. In other words, the Department seeks to establish two different valuations on the same properties as of the same basic date for different years.

An interesting statement in regard to the reopening of closed issues in tax cases was made in the Senate by Senator Carter Glass, formerly Secretary of the Treasury, under whose administration the silver and copper valuations originally were determined. Senator Glass says:

"My attitude is that we should put an end to this uncertainty of the business interests of this country. I think the Treasury, with its trained experts, should make the adjustments in the beginning and stand upon them, unless irregularity, concealment or fraud shall afterwards be disclosed, and that when people pay their taxes they may know they are acquitted of their obligation to the Government."

#### INVESTIGATION RAPPED

Defending the acts of his administration while Secretary of the Treasury, Senator Glass said it was not his judgment that the Couzens Committee should have been continued. "Had I been in the Chamber when it was proposed, I should have objected to continuation of the inquiry," he said. "I am perfectly confident that it is not going to result in a return to the Treasury of a single dollar in taxes, whereas I am quite as firmly convinced that the continuation of the inquiry has produced a state of mind in the Treasury among its officials, major and minor, charged with the duty of assessing taxes, that it inevitably will result in disadvantage to the public and in hardship to the taxpayers."

Replying to criticisms concerning the publication of testimony taken by the investigating committee in secret sessions, Senator Couzens asserted that "The chairman of the committee has given out no information whatever. The information the press has published has been taken from the public records of the Senate. If the press has published *ex parte* statements, if the press has published only one side, that certainly cannot be charged to the committee or to the chairman of the committee. I have purposely refrained from attempting in any manner, shape, or form to bias public opinion and have left it entirely to the record."

#### FUTURE STEPS IN REVALUATION

The influence of the investigation on the policy of the Treasury already has had its effect. The Metals Valuation Section has practically completed the revaluation of (Continued on page 175)

## DISCUSSIONS OF PRACTICAL OPERATING PROBLEMS CINCINNATI, OHIO, MAY 25-29, 1925

*Cutting Costs In Coal Operation Is The Clearest Road To Profit—The Cincinnati Convention Is Distinctly A Meeting Of Practical Operating Men, With The Discussion Devoted To Practical Operating Problems*

TUESDAY MORNING, MAY 26

**SUBJECT: "Mechanical and Electrical Equipment Problems"**

The discussion will include consideration of the use of acid-resisting metals for mine drainage equipment, the hazards of stray currents, the use of speed reducers, economies which can be effected by the proper use of watt-hour meters and the general use of storage batteries in mines.

TUESDAY AFTERNOON

**SUBJECT: "Control of Mining Equipment"**

One of the most important developments in connection with securing lower costs per ton lies in the development of the control of mining equipment. The discussions on Tuesday afternoon will include a consideration of the control of mine pumps, mine fans, tipples, machinery, and mine haulage as well as automatic sub-stations.

WEDNESDAY MORNING, MAY 27

**SUBJECT: "Mechanical Loading In All Its Phases"**

The session will be devoted to a consideration of two general topics: first, an introductory statement by a representative of the U. S. Bureau of Mines covering "Underground Loaders in Use Today." The second topic will be a consideration of "Practical Experience in the Use of Mechanical Loaders."

The discussion following will include a presentation of the point of view of operating officials who have actually used mechanical loaders in all of the various coal mining districts. It will be a live discussion and will bring together for presentation the most important facts relative to the success, limitations and advantages in the use of mechanical loaders under varying conditions.

WEDNESDAY AFTERNOON

**SUBJECT: "Practical Experience In The Use Of Mechanical Loaders"**

The discussion covering all phases of practical experience in the use of mechanical loaders will be continued during the Wednesday afternoon session. There will be an opportunity for questions, informal discussion on the floor and interchange of ideas among operating men relative to the use of mechanical loaders.

THURSDAY MORNING, MAY 28

**SUBJECT: "Mutual Adaptation of Mining Methods and Loading Machines"**

It is generally recognized that the effective use of mechanical loaders requires a mutual adaptation of mining methods and of machines in order to secure the best results. No topic is of greater interest to the coal mining fraternity than this. Every phase of this subject will be covered in the Thursday morning session. A consideration of what methods and what machines have been most successful in connection with the mining of thick coal, of thin coal and under varying roof conditions. This discussion will be followed by a presentation of some successful adaptations of mining methods and loading machines by operating men who have had special experience and have secured satisfactory results.

THURSDAY AFTERNOON

**SUBJECT: "Utilization of Face and Other Portable Conveyors"**

To handle mechanical loading effectively, it is generally recognized that some form of conveyance is necessary in order to take care of the output. The discussion on Thursday afternoon will cover all phases of the use of face and other portable conveyors both with and without loading machines.

THURSDAY EVENING, MAY 28

**SUBJECT: "The Advantages of Graphic Charts in the Interpretation of Coal Mine Costs"**

Cutting costs in coal operations requires a constant watching of the costs. The discussion of this subject will point out effective methods for keeping close watch over operating costs in coal mines.

FRIDAY MORNING, MAY 29

**SUBJECT: "Effective Practice and Actual Costs of Rock Dusting"**

The elimination of mine explosions is an important factor in connection with securing economies in coal production. The effective practice and actual costs of rock dusting will be brought out in an informal discussion on Friday morning. The leaders of the discussions will be men who are particularly well posted in this general subject.

FRIDAY AFTERNOON

**SUBJECT: "Effective Cutting and Shooting Methods to Secure Greater Realization"**

This discussion will include consideration of the best methods for cutting, shearing, snubbing and shooting, and will emphasize the actual results secured. As a supplementary discussion there will be a consideration of tippie preparation.

*125 Displays of Coal Mining Equipment and Machinery at the National Exposition of Coal Mine Equipment and Machinery of the American Mining Congress*

## GENERAL RATE INVESTIGATION ORDERED BY INTERSTATE COMMERCE COMMISSION

*General Investigation Of Rate Structure Will Include Study Of Relationship Of Rates On Raw Materials And On Finished Products, Meeting Contention Of American Mining Congress That Inquiry Should Not Be Confined To Products Of Agriculture*

**A**CTING under the authority of the Senate Joint Resolution passed by the last Congress, directing an investigation of the rate structure of common carriers subject to the Interstate Commerce Act, the Interstate Commerce Commission has instituted a general inquiry bringing into question all the rates, fares and charges, and all classifications, regulations and practices relating thereto, for the transportation of all kinds and classes of traffic. Shippers are given until May 15 to file statements or complaints concerning matters they desire to have considered.

The original resolution introduced in the Senate on this subject was designed to bring out particularly the effect of railroad rates upon the agricultural industry; but it was the contention of the American Mining Congress that if such an inquiry were thus limited in scope to a particular industry, the results might be discriminatory against other industries, especially producers of raw mine products. The resolution, therefore, was amended to broaden the scope of the inquiry and was then passed.

In the hearings held in 1922, prior to the decision of the Commission in the 1922 *Reduced Rates* case, the American Mining Congress contended that the rates on the products of mines should be reduced to such a level as would permit their full development and free movement, and to protect potential tonnage from destruction by reason of selective mining. The Commission will consider this phase of the subject.

The Commission states in connection with its order that it will not enter at once upon extensive hearings. "It intends," says the statement, "to conduct the investigation in a manner conducive to full and orderly development of material facts and with as little delay and expense to shippers, carriers and the Government and as little disturbing effect upon production, distribution and a free flow of commerce, as may be found practicable.

According to the statement, any changes made in the rate structure of the country, will be made after due consideration of the following factors: "the conditions which prevail in the several industries of the country," the "general and comparative levels in market values of various commodities," the "natural and proper development of the country as a whole," and "the maintenance of

an adequate system of transportation," insofar as these matters affect the proper adjustment of the general rate structure.

Notice was given that representatives of all carriers, State, Federal and local authorities, and shippers or organizations of shippers, might file complaints, statements, briefs, or memoranda, verified by affidavit, setting forth the particular conditions, rates, practices, regulations or classes of traffic they believe should be considered. These briefs, statements, and complaints may be filed on or before May 15, and answers to them, in case answers are necessary, may be filed by the carriers or other interested parties on or before June 15.

In the conduct of the investigation the Commission will avail itself, as far as it can, of the assistance and cooperation of State authorities possessing rate-making powers. In its announcement the Commission also invokes the cordial cooperation and assistance of all shippers and carriers.

It is understood that the Commission heretofore has considered it impracticable to undertake to establish a rate structure based in any material degree on economic conditions. In this investigation economic conditions will be a primary consideration. Both mining and agriculture need lower rates. But the earnings of the carriers may not be sufficient to permit a general reduction on the products of mines and agriculture, unless compensatory increases can be made on some other classes of traffic, or unless it can be shown that the volume of mining and agricultural traffic will be stimulated to such an extent by the needed reductions that earnings will be compensatory to the carriers without increases on other classes of traffic.

The investigation presumably will go into the matter much farther than this, however, because both the Commission and the carriers will seek light on the question of the effect of existing rate levels on potential traffic. The American Mining Congress has urged the Commission to inquire into the question of selective mining. If existing rate levels force selective mining, then much potential tonnage is being wasted, and this would have the effect of jeopardizing the earnings of the carriers of mine products, ten, twenty, or thirty years hence, according to the American Mining Congress.

This question was discussed briefly in

a report issued by the Senate Commission on Gold and Silver Inquiry, which recently concluded exhaustive investigation into mining conditions prevailing in the West. A study of the matter also was made three years ago by a committee of three examiners of the Interstate Commerce Commission, but the report of this committee was not released. It was stated, however, that no definite conclusions were reached on account of the lack of adequate data.

In directing this investigation, Congress did not make a special appropriation for the work, so that the Commission must defray the cost of the inquiry out of its regular appropriation and must carry on the work with its present personnel. Whether or not this will have the effect of limiting the scope of the inquiry or of making an exhaustive study of all pertinent conditions impossible, will be demonstrated as the investigation progresses. If the Commission finds that it is handicapped by reason of inadequate funds, it is probable that the next Congress will be asked for a deficiency appropriation.

### SENATORS ASSAIL VALUATIONS

(Continued from page 173)

the copper companies and is now proceeding with the silver revaluation work. The copper cases probably will be the first to go to the Board of Tax Appeals. If the findings of fact of the Metals Valuation Section are upheld by the Board, the companies then will have to pay any additional taxes found to be due for the prior years involved, and will be compelled to appeal to the courts for recovery of these taxes.

The silver companies will be granted further hearings before the revised valuations are made effective. It is understood that a few of the silver companies will not have their original valuations revised on account of the fact that the original evidence of values submitted was of such a nature that estimates were not required. In other words, proof of values claimed by the companies was considered sufficient by the Department because it was not based upon estimates or analytic appraisals. The date of the hearings on silver cases has not been announced by the Commissioner, but it is understood that notice of these hearings will be sent out in the near future.

## COAL'S WAGE SCALE PROBLEM

### *A Statement Of What Has Been Done To Solve It And An Analysis Of The Problem Which Remains For The Operators To Attempt To Solve*

By GEORGE H. CUSHING

**A** YEAR ago, last January, the coal miners and operators of the Central Competitive Field, met at Jacksonville, Florida, to revise the wage schedule. They ended by renewing, in toto, the scale then in effect. The signatures were attached for a period of three years.

On March 16th, this year, as many members of the operators' scale committee as could be persuaded to attend, held a preliminary meeting at Cleveland, Ohio, to discuss whether a formal meeting should be held on the 17th. At the latter meeting, there was to have been discussed the advisability of calling a conference of both miners and operators to revise the scale which, in one year, had proved to be inoperative because its terms are "uneconomic."

Four states were represented at the Jacksonville conference of a year ago. Only three states were represented at the preliminary meeting on the 16th of March. The absence of one state would, of itself, have made further proceedings impossible. But, the preliminary conference developed a fatal weakness. Each of the three groups favored a different method of procedure. What those differences amounted to is immaterial in the light of the fact that one of the four states was not represented. Since the contract was signed by all four, any attempt to change its terms must have, equally, the support of all four. Therefore, while it might prove ever so diverting to discuss the views and differences of those who did attend, it would be but a waste of time over mere opinions. And, while we allowed ourselves to wander over collateral issues, the concrete subject would filter unobserved through our fingers.

When the contract had been signed for three years and when all of those who signed it believed that the industry could not live through it and when its modification becomes necessary to the financial soundness of the country, a situation is presented which commands attention. Without going so elaborately into the subject as to quote the statistics, the facts are that shortly after the Jacksonville agreement was signed, the competitive nonunion mines announced another and a different wage scale. This, for all practical purposes, was 50 cents per ton below that of the union mines. The nonunion operators, conscious that this difference in cost put them in position to command the market, began at once to expand their productive capacity to satisfy the demand which they con-

fidently anticipated. And, to start the trade flowing to their mines, they expressed their wage advantage in a price change. Thus, and soon, the nonunion price was 50 cents a ton lower than the union price.

It developed that the larger consumers do not change their buying habits so quickly as the nonunion operators believed they would. Also, many of the larger buyers were wholly unprepared for the relentless coal price war which was to follow this clean division of the coal industry into two wage groups. Therefore, the buyers made, as usual, their contracts for the year with their old sources of supply. Thus, for the first year, the nonunion mines were preparing to do business which they did not get and the union mines were kept alive by contracts unexpectedly obtained.

At the end of the year the whole situation had changed. The prices quoted by the nonunion mines had made such a deep impression upon the slow-changing market that a different future had to be faced. Also, it was painfully evident that the saving contracts, made a year previously, were expiring. The combination of the low prices quoted by nonunion mines and of the almost complete absence of contracts, was too much for the union mines. They had to put themselves in a competitive position or perish. This fact stared every union operator in the face. It is easy to believe, therefore, that the operators of Western Pennsylvania, Ohio, Indiana and Illinois were and are unanimous in their demand for a revision of the wage contract. That they might not be able to agree upon the method of procedure is also easy to imagine.

What the union operators saw was that the nonunion mines were finally in position to get the business they had prepared themselves to absorb. This meant that the union mines were about to be thrown increasingly into idleness. And, the net result of it all was that the total productive capacity of the bituminous coal mines was being increased by the very method which was designed and adopted to decrease it. Thus only one year was needed to bring one of the most monumental experiments in the history of economics to a mass of ruin.

On the eve of the Cleveland conference the whole situation had been ap-

praised as here has been done. The authors of the experiment admitted the disaster but urged that the experiment lacked in only one particular—it had not been carried far enough to relieve the coal industry of all of its dead timber. This statement was not convincing to the union operators. What they saw was that as the old and established mines in one field were being driven into bankruptcy and either closed or abandoned at the very moment where new mines were opening in a new field. Having this concrete evidence before them, they were in no mood to pursue such a scrap of sophistry to any more bitter conclusion. Thus it was that, in the preliminary Cleveland conference, men spoke with such candor and vigor as has seldom been heard in a like assemblage. The demand for an end of the experiment was insistent and vigorous.

When it was known that no conference was to be held, immediately, one action was taken which must command attention. One group of mines had been supplying one group of customers with about 2,000,000 tons of coal a year. The consumers announced that, in the absence of a wage readjustment, they would go into the nonunion field for their coal. The mines, having no other customers in sight and hence no need to produce the coal, decided to close down until the wage schedule might be rearranged—ostensibly for the next two years. This action, while on a grand scale, is typical of that taken by both users and operators.

That brings us to this fact. The investment in bituminous coal mines is roughly, three billion dollars. At the time this investment was made, the union dominated mines having two-thirds of the total productive capacity. It is now known that nearly all of those union miners are in the predicament just described. That being true, it is obvious that this country is facing a major economic problem. The situation is, indeed, so serious as to demand analysis. This analyses can be made even if it may prove difficult to point the way out.

For purposes which will not always stand close examination, it has been said that the labor problem in the coal mines is "peculiar." Few statements which are wholly true have ever been more misleading. The impression sought to be left was that coal offers a poorer market for labor than any other industry. This is not true. For instance, it is not true that as a peculiar protest

against unjust employes, we have labor unions in the coal mines and nowhere else. The fact is that they exist in nearly every other industry in America and in every part of the civilized world.

It is not true, as contended, that labor works intermittently in the coal mines and nowhere else. On the contrary, in no industry known to man is the demand for its product equal and constant over the months and the years. Instead, the fact is that all industries have their seasons; they, therefore, have an intermittent need for coal. Thus the fact is that the demand for coal fluctuates with the need for it. Thus, if there is intermittency in the production of coal, it but reflects a like intermittency in the demand for and the use of it.

And, it is not true that labor is making any more striking demands upon the operators than it is making in any other industry. In all of these respects, the labor problem in coal is exactly the same problem as that faced by every other industry. And to that vast extent, the labor problem is "common" in coal, rather than "peculiar."

There are two particulars, however, in which the method of procedure in coal is different from that elsewhere. And, it is this point which all students of the coal question have studiously ignored. That is, in the coal field, we have the "one big union." We thus have the theory of unionism carried to its ultimate.

And, as one of the economic results of the war, that "one big union" has been able to act as a unit because it was able to make and is now able to hold one contract for all workers. This contract is made at one time, for a stipulated number of years. It, therefore, expires at all points at the same time. Thus, the "one big union" in coal, by being able to call all of its members out on a strike at one time, is in position to coerce not only the employers but the consumers. That is one situation which exists in coal and nowhere else. It is doubtful whether it could or would be allowed to exist anywhere else.

Also, the present form of contract between the miners and the operators was adopted in 1896—practically thirty years ago. It has been added to, in those thirty years; the basic wage, however, has never been changed. To be specific, when this scale was written, coal was mined, exclusively, by the pick mining method. All of the mining machines now in common use have been introduced in the last thirty years. Today, practically no coal is pick mined. The miners of this generation have become so unused to that old and obsolete method that when called upon to do so, they can no longer mine coal with the hand pick. Even so, the wage schedule

clings to the fiction of the pick miner; it is drawn, primarily, to compensate the pick miner. The other schedules, which have been added, have been designed to accommodate those who "help" the pick miner. Nowhere in the scale is there any recognition of the fact that the men who now work in the mine have supplanted the pick miner; have made his existence unnecessary and practically impossible. In this respect, the situation in coal is decidedly "peculiar." It presents a situation known in no industry which has gone—as coal has done—extensively in for the modern theory of quantity production.

The problem thus presented in coal is: We, as an industry and as a people, went into the Jacksonville agreement on a purely experimental basis. That agreement was signed for three years to accomplish only one purpose—to wipe out the "unnecessary" mines in the union group. We have learned, at the end of a year, that it wipes out practically all of the union mines.

The original purpose was to eliminate part of the mines for the purpose of

decreasing, arbitrarily, the productive capacity of the coal mines as a whole. Instead of doing any such thing, one group was closed while another group, in another field, was opening and expanding. Thus by the very process by which we sought liquidation and deflation, we got expansion and inflation. When the result is that two billions of investments are sinking into bankruptcy and ruin, we face the fact that such a calamity is dragging the whole economic structure down with it.

As we turn from this picture of destruction to seek the remedy, we find that the coal labor problem resolves itself into two questions. One of them is to modify, in some way, the "one big union" idea and to end its power to coerce the people by terminating the national agreement and the resultant nation-wide strike. The other is to rewrite a wage schedule to bring it more nearly abreast of the times than 1896 when this scale was first written. Of the two, the last is the most important and is the only method which seems to be within reach.

## UNIVERSITIES OFFER FELLOWSHIPS

*Eight Schools Cooperate With Bureau of Mines In Study Of Mining, Metallurgical and Chemical Problems*

**G**RADUATE fellowships in mining, metallurgical, and chemical research are offered by prominent institutions of learning in various states, in cooperation with the United States Bureau of Mines. The object in offering these fellowships is to assist in the solution of different problems being studied by the Bureau of Mines that are of particular importance to the region in which these institutions are located. The fellowships offer excellent opportunities for qualified young men to become proficient in the fields of mining, metallurgical and chemical technology, and to prepare themselves for highly specialized work in these fields.

The following named institutions offer such fellowships for the college year 1925-1926:

University of Alabama, Tuscaloosa, Ala.

University of Arizona, Tucson, Ariz.  
Carnegie Institute of Technology, Pittsburgh, Pa.

University of Missouri, Rolla, Mo.

Ohio State University, Columbus, O.  
University of Utah, Salt Lake City, Utah.

University of Washington, Seattle, Wash.

University of Idaho, Moscow, Idaho.

The School of Mines of the College of Engineering, University of Alabama, offers five fellowships in mining and metallurgical research. The value of

each fellowship is \$540.00 per year. The problems selected for investigation relate to beneficiation of iron ores and include the following phases: Gravity concentration by means of screens, classifiers, jigs, tables, log washers, etc.; reduction of iron ores by means of roasting furnaces; magnetic concentration; sintering of fine iron ore concentrates.

The Arizona Bureau of Mines, a subdivision of the College of Mines and Engineering of the University of Arizona, offers two fellowships yielding \$660.00 per year. The subjects to be investigated will be selected from the following list: Factors governing acid formation in the ferric sulphate-sulphuric acid process; treatment of mixed copper ores by percolation leaching followed by flotation; commercial methods of precipitating copper from impure dilute solution; heat involved in the roasting of various sulphide minerals and ores; copper losses in slag as affected by slag forming constituents, including magnetite.

The Cooperative Mining Courses of the Carnegie Institute of Technology offer four fellowships in coal-mining research. Each fellowship carries a stipend of \$750.00. Subjects suggested for investigation relate to the origin and constitution of coal; acid mine waters; efficiency in coal mining; coal-washing methods; utilization of coal; coal-mine safety; spontaneous combustion of coal,

and coal-mine explosions. Certain metallurgical fellowships will also be offered by the Carnegie Institute of Technology, although the details of these fellowships are not yet ready to be announced.

In cooperation with the State Mining Experiment Station the School of Mines and Metallurgy of the University of Missouri offers four fellowships, the income of which is \$800.00 each per annum. These fellowships are open to graduates who have had the equivalent of a Bachelor of Science degree and have had the proper training in mining, metallurgy, or chemistry, and who are qualified to undertake research work. Their class work will be directed by the heads of the departments of instruction, but the greater portion of their time will be spent in research work under the direction of the Bureau of Mines staff resident at the School of Mines. The subjects to be investigated are the metallurgy of zinc; refractories for the metallurgy of zinc; and physical metallurgy, including the heat treatment of steel.

The Engineering Experiment Station of Ohio State University offers three fellowships, each with a stipend of \$750.00 per school year. Research in the ceramic and allied fields will be undertaken by these fellows. In 1924-1925, the following subjects were investigated: The effect of bathing atmosphere on the load carrying capacities of refractories; the heat necessary to fire ceramic wares; development of bonds for spinel refractories.

The University of Utah offers five fellowships, each valued at \$720.00 per annum. The subjects to be investigated will be selected from the following list: Pulverizing ores and minerals; hydrocarbons, field investigations; flotation, development of differential methods of separating various sulphide ores; hydrometallurgy of lead; sulphate roasting of complex sulphide ores.

The College of Mines of the University of Washington offers five fellowships for research in coal and ceramics. The value of each fellowship is \$720.00 per year. The subjects selected for investigation are the beneficiation of coal, especially coal washing; and the study of super-refractories, whiteware bodies, and other problems that are of especial importance to the State of Washington, the Pacific Northwest, and Alaska. The investigations consist principally of laboratory work directed largely by Bureau of Mines technologists.

The University of Idaho fellowships are valued at \$750.00. Previous investigations at this institution have dealt with the treatment of various classes of gold-silver ores.

Detailed information in regard to the terms of these various fellowships may be obtained from the Department of the Interior, Bureau of Mines, Washington,

D. C., or from the different institutions named.

### MACHINERY EXPORTS

RECENT figures published by the United States Department of Commerce show that exports of machinery from the United States for the fiscal year ended June 30, 1924, increased in value \$13,000,000 over the \$117,000,000 total for the previous fiscal year, or 14 percent, whereas the British industry records for 1923 show a 40 percent decline in export trade from prewar figures, and the German trade a 33 percent drop in the same period. Neither Great Britain nor Germany can be said to have made much headway toward the regaining of their foreign markets lost during the war.

The West Virginia Geological Survey has just issued a new publication, entitled "Detailed Report on Mineral and Grant Counties," by David B. Reger, assisted by other members of the Survey Staff, issued under date of September 1, 1924, containing 866 pages + XXIV pages of Introductory matter; illustrated with 43 half-tone plates and 31 zinc etchings in the text, accompanied by a separate case of topographic and geologic maps, each county being mapped separately. Price, delivery charges prepaid, \$3.25. Extra copies of Topographic maps of either county, 50 cents each; extra copies of Geologic maps of either county, 75 cents each.

They also have issued a new supply of the Detailed County Report on Ohio, Brooke and Hancock Counties with its accompanying atlas of maps, the Geological Survey has had many calls for Topographic and Geologic Maps of this important manufacturing area of West Virginia.

The Geologic Survey is now prepared to supply copies of the Topographic Map of this area, the map being printed on one sheet and being on the scale of one mile to the inch. The cultural features have been brought up to date. All the roads, streams, towns, villages, schoolhouses, and much other data have been placed on this map. The State Roads with State Route Numbers and all Main County Roads are shown in red, and by-roads and trails are shown in black.

Price of Topographic Map, 75 cents.

The Geologic Map of this area will be published within five or six months.

The Bureau of Mines has issued a report, Bulletin 233, outlining factors and conditions influencing corrosion of equipment in oil and gas fields, and describing methods of combating such corrosion.

William Andrew Clark, the world's copper king and a former United States senator from Montana, died at his residence in New York on March 2.

Senator Clark was the last of the three Montana mining leaders, Daly, Heinze and Clark, around whom so much of Montana's history is woven.

He was born in Connellsville, Pa., in 1839, and a few years later moved to Iowa with his family. He was barely 21 when he joined the first gold rush to Colorado. By 1872 he had holdings in half a dozen mining enterprises.

Then, with his business demanding every attention and a wife and several small children living in the pioneer home he had established, he did a thing characteristic of his whole career. He took a year's leave, came to New York and studied minerology at Columbia University. The knowledge he gained here, supplemented by his practical experience, made him one of the leading minerologists in the West.

Thereafter he never invested in a mining property without first inspecting it himself.

His energetic business policy cost him the friendship of Montana's other great mining king, Marcus Daly, and started a feud which thrice balked him for the Montana senatorship.

Finally after a long and exceedingly acrimonious contest, he was, in 1890, nominated by the Democrats for United States senator and claimed his election, but was denied his seat. In 1898 he was elected to the Senate. A contest ensued, but before the investigation concluded he resigned. He was finally elected for the term from 1901 to 1907.

Montana old-timers never tire of telling of the spectacular financial and political war between Daly and Clark. For twenty years Montana was divided into Clark and Daly factions, each one unable to see any flaws in its idol or any good in the other side. You can still start heated arguments in Montana—among the pioneers—by comparing the characters of Clark and Daly. But in their legal battles for control of mining properties around Butte, the apex principle of mining law was established.

At the time of Senator Clark's death he was president of the United Verde Copper Company, in which he acquired a large interest about 1890, and at the time of his death is said to have owned all but five shares of the stock. He was also a director in many other corporations. With his death the mining world loses one of its most illustrious figures.

## CALIFORNIA TURNS ATTENTION TO INDUSTRIAL MINERAL DEVELOPMENT

*Fifty-four Different Mineral Substances Were Produced In Golden State In 1924—Structural Minerals Conference at Sacramento Calls Attention To Need Of Developing Deposits—Industrial Mineral Conference at Los Angeles Next Month*

CALIFORNIA, with a wealth of raw mineral materials and potential hydroelectric power unequaled for a like area anywhere on the globe, is destined to become one of the greatest manufacturing commonwealths in the world, amply able to support millions of industrial workers.

In the past California's mineral development has been largely concentrated on the precious metals, copper, limestone, oil and salines. Today an awakening to the immense possibilities of developing her vast storehouses of other industrial and structural minerals is in the air. Throughout the state attention is being focused on these minerals.

Mineral statistics in connection with California's industrial future are astounding. There have been surveyed at different times large deposits of high-grade iron ore in the state, while there is known to exist an equal amount of coal, which promises to develop into a fine grade of bituminous at depth. Yet only 3,102 tons of iron ore and 1,010 tons of coal were produced in 1923, according to the report of the state mineralogist, Lloyd L. Root. Authentic figures for 1924 are not yet available.

### LARGE ASBESTOS DEPOSITS

It is conservatively estimated that known asbestos deposits would supply the needs of the nation for many years, yet the California output in 1923 was only 20 tons. Recently deposits of high-grade chrysotile asbestos, spinning grade variety, have been reported from Calaveras, Monterey and Nevada Counties.

California has mountains of limestone, of a fine grade. A Pit River deposit in Shasta County is estimated at 1,000,000,000 tons, while a large deposit is in sight in a bluff near Gazelle, Siskiyou County. In cement output California now ranks third, with a production of 10,825,405 barrels, valued at \$25,999,203, for 1923, while the yield last year

By BERT FOSTER HEWS\*

is estimated at \$28,320,000. In 1913 California's cement production was valued at only \$7,743,024.

Clay products for the nation could be fabricated from the extensive high-grade clay deposits of every commercial grade and variety found in this State. Many of the clays are peculiarly adapted for architectural terra cotta, and this is being manufactured at Lincoln, in Placer County, for all parts of the



One of several high grade slate quarries in the vicinity of Placerville, El Dorado County, California.

world. Decorative pottery is in its infancy, with the finest raw materials, for glazing as well as making, available in great quantities.

All the alloy metals and refractory materials necessary for making every known grade of steel are found in California, including manganese, molybdenum, tungsten, magnesite, chromite, dolomite, limestone, flourspar and even zirconia, a rare refractory material found near Lincoln. Many of these minerals are found close to the iron deposits, the best known ledges of which are located in Madera, Placer, Riverside, Shasta and San Bernardino Counties. California is now producing about 350,000 tons of steel ingots annually, but nearly all is made from scrap iron, only a little Utah pig iron being used. The Heroult electric iron-smelting furnace in Shasta County is being reopened.

Although California is not known as a great copper State, yet copper deposits exist in nearly every one of its 58 counties, and has been mined to some extent in most of them. The Shasta copper belt consists of nearly 30 miles of continuous copper deposits, while the copper belt of the western slope of the Sierras extends for nearly 400 miles, and that of the north coast range is 150 miles long. A copper deposit on the Klamath River, Siskiyou County, recently acquired by the Guggenheims, has an estimated

available tonnage of 17,000,000 tons in sight. Owing to the high percentage of gold in the copper ores of Shasta and Plumas Counties, many of the mines continued to operate during the lean years following the close of the war. In 1916 California produced 55,809,019 pounds, bringing \$13,729,017, while its 1923 output, largely from Plumas County, totaled 28,346,860 pounds, valued at \$4,166,989. Last year's yield is estimated to have increased in value \$2,500,000. Extensive deposits also exist in the southeastern part of the state.

There is a large deposit of diatomaceous earth in Siskiyou County. Only a little development work has been done. Other large deposits occur in different sections. Considerable deposits of gypsum occur in Fresno, Imperial, Kern, Los Angeles, Riverside, San Bernardino, San Diego, San Luis Obispo and Santa Barbara Counties, yet the production in 1923 amounted to only 86,140 tons, valued at \$289,136.

### YIELDS BULK OF QUICKSILVER

California possesses the largest quicksilver mines on the continent, and has large deposits of cinnebar as yet little developed. During the past few years the production has been at a low ebb, but it is now on the upward trend, and will rapidly increase if the mercury turbine boiler proves a success. In 1923 the production totaled 5,458 flasks, valued at \$332,851, while the yield last

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year is expected to exceed 8,000 flasks. The 1923 output was 69 percent of the nation's production. During the years 1887-1923 California produced \$107,366,-208 in quicksilver.

Referring back to coal again, there are some hopeful signs of a real development of this fuel. Three ledges of coal are under development in the Clover Creek and Oak Run fields of Shasta County. At the Frisbie property a 450-foot tunnel has been driven on a 6-foot ledge, in coal all the way, while an 8-foot vein of coal has been penetrated 250 feet by an adit on the Stacher property. Driving of a prospect tunnel is under way at the Hunt mine. The coal, of a sub-bituminous type, increases in quality with development. This spring the shipping of a good grade of domestic coal from the Carbon mine near Dos Rios, in Mendocino County, will start. The output is estimated at 25,000 tons annually. A recent test of some of the Shasta coal shows more pronounced tendencies of anthracite coal than of bituminous. Other known coal deposits are located in Alameda, Amador, Contra Costa, Fresno, Monterey, Orange, Riverside and Siskiyou Counties. Some coal is being shipped from the Belle Vista district of Amador County. California reached the peak of coal production in 1880, when the output totaled 236,950 tons.

#### NUMEROUS OTHER MINERALS

Only the highlights of California's mineral output are touched upon in the above paragraphs, preliminary to the story of the extensive campaign being planned to double the State's mineral output. In addition to the minerals mentioned, California also produces barytes, bituminous rock, brick, tile, calcium chloride, quartz crystals, feldspar, fuller's earth, gems and jewelers' materials (including diamonds, tourmaline, topaz, sapphires, kunzite, turquois and rubies), gold, granite, graphite, lead, lime, lithia mica, magnesium salts, marble, mineral paint, mineral waters, natural gas, onyx and travertine, petroleum, platinum, potash, pumice, pyrites, salt, sandstone, oil shale, silica, sillimanite, silver, slate, soapstone, soda, miscellaneous stone (crushed rock, sand and gravel), sulphur, talc, volcanic ash and zinc. California's mineral production in 1924 is estimated at \$358,745,000.

In addition, California has undeveloped commercial deposits of bauxite (aluminum), antimony, arsenic, bismuth, cadmium, cobalt, molybdenum, nickel, vanadium, mica, strontium, oxide of tin, nitrates and fluorspar.

It is estimated that California could supply the mineral paint needs of the world. Almost every known raw mineral material for paint making is found extensively in many counties.

#### STRUCTURAL MINERAL CONFERENCE

Through its Industrial and Structural Minerals Division, of which F. W. Bunyan, steel metallurgist of the Southern Pacific Company, is chairman, the Department of Mines and Mining of the Sacramento Chamber of Commerce took decisive action to call attention to the grave need of greater development and use of California's structural minerals by holding a structural minerals conference of producers and buyers in Sacramento the latter part of January.

This department has pioneered since its organization, March 28, 1923, in arousing state-wide interest in the greater development of California's commercial minerals, realizing that the State's industrial future is dependent on the furnishing in quantity of the basic raw materials of manufacturing minerals. Now splendid cooperation is being received from the geological department of the Southern Pacific Company, which is conducting, under the direction of Assistant Geologist C. M. Redfern, a survey of five Western States, including California, to determine available deposits of industrial minerals and the minerals being used in manufacturing, and also from the California Development Association. Through the activities of the industrial department of the association, mining committees have been formed in both Northern and Southern California, and several mining conferences held.

At the Sacramento structural minerals conference it was determined that co-ordination of the structural industries, standardization of structural products, organization of structural producers and an aggressive campaign of publicity on California's structural minerals and products were the fundamental steps to be taken in bringing about greater mineral development. It was felt that the importation of foreign structural mineral materials into California could not

be stopped until the above steps had been carried out.

#### RESOLUTIONS ADOPTED

Resolutions adopted at the conference before its adjournment, briefly summarized, are as follows:

Pointing out the need of a conference of representatives of financial and civic organizations, mining men, manufacturers using mineral materials, architects, officials of builders' exchanges, manufacturers of mining machinery and supplies, and representatives of rail and steamship lines to formulate a state-wide program and asking the California Development Association to call the meeting.

Endorsing the proposed expansion of the State Mining Bureau into a Department of Mines and Mineral Resources, and pointing out that the mineral industry is most successful in those States, colonies and territories having such departments.

Recommending the adoption of a 50 percent increase in the duty on raw and calcined magnesite and calling attention to the present precarious condition of the California magnesite industry owing to the foreign importations of the mineral.

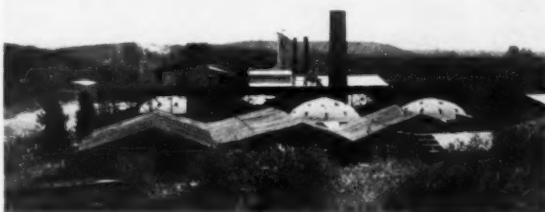
Authorizing the appointment of a committee on the permanent organization and standardization of the structural industries of California.

The Sacramento conference marked the initial effort to bring together the producers and users of structural minerals and products, and is regarded as the most important step forward taken to promote industrial development in California in many years.

#### ARRANGE STATE-WIDE MEETING

Charles S. Knight, industrial director of the California Development Association, has completed plans for holding the state-wide conference on structural and industrial minerals and allied industries in Los Angeles on Friday, May 15. A preliminary meeting of 10 representatives each of the northern and southern groups will be held in Los Angeles April 7 to formulate the program for the conference, and arrangements are now being made by Mr. Knight and the writer for a similar session in San Francisco April 3.

These groups have been divided into the following classifications: Metallic, nonmetallic, oil and gas, related industries, and organizations. Members of the Southern California Committee on Mineral Development are: Rush T. Sill, engineer, chairman; R. D. Sangster, Los Angeles Chamber of Commerce;



Kiln of the Ione Fire Brick Company, Ione, Amador County, California.

Lloyd L. Root, state mineralogist; Edwin Higgins, executive secretary, Los Angeles Chamber of Mines and Oil; William L. Honnold, consulting engineer; Robert Linton, Pacific Clay Products Co.; J. F. Jellick, Pacific Portland Cement Association; D. J. McKinnon, Braun Corporation; F. B. Lewis, Southern California Edison Co.

Members of the northern mining group are: William J. Loring, Mother Lode operator and engineer, chairman; Judge John F. Davis, San Francisco mining attorney; R. E. Fisher, Pacific Gas & Electric Co.; Arthur B. Foote, manager, North Star mine, Grass Valley; Fletcher Hamilton, engineer and former State mineralogist; Clarence E. Jarvis, vice-president, Sacramento Department of Mines; Robert I. Kerr, secretary, California Metal & Mineral Producers' Association; Charles W. Merrill, mining machinery, San Francisco; Frank H. Probert, dean, University of California, College of Mining, Berkeley; Lloyd L. Root, State mineralogist.

What has been said about the immense deposits and variety of commercial minerals in California applies equally well to most of the Western States. It is particularly true of Nevada, southwestern Oregon, parts of Washington, British Columbia and Arizona. Through the efforts of Gov. James G. Scrugham, of Nevada, a mining man, an intensive campaign is under way in that State to attract capital to the development of her industrial minerals, which the Governor believes will produce far more wealth than even her famed Comstock Lode and other rich gold and silver districts.

#### MINING ROMANCE STILL LIVES

With the adoption of a concrete state-wide program in May, it is confidentially believed that California will enter her great industrial era. Nothing is lacking to make this State the industrial wonderland of the world within the next 25 years. When an intensive prospecting and development of structural and industrial minerals is under way no one can prophesy what new mineral storehouses will be found, nor what rare and unusual minerals will be uncovered. It must be remembered that several of the mineral counties, particularly those isolated ones in the high Sierras, have never been examined except for the precious metals.

Will the source of the diamonds in the Cherokee field of Butte County be found? Will the 70-year search for the platinum lode from which this precious metal has been washed down into the streams, from where it is recovered today, be finally rewarded? Or will a great body of radium-bearing ore be uncovered in some of the weird mineralized ranges of Alpine, Inyo, Lassen, Mono, Riverside, San Bernardino and San Diego Counties or

the much-sought coking coal beds be located?

The romance of the Days of '49 still persists, though under a different guise, in this great mineral wonderland of the West for the prospector who goes forth in his flivver to seek the more prosaic commercial mineral.

#### STANDARDIZATION OF DRILL STEEL

(Continued from page 164)

to standard machines and steel, soon broke up and exhausted the supply on hand.

Most of the schemes outlined above for standardizing on fewer machines and sections of steel in a comparatively short time without scrapping equipment on hand were developed by Messrs. Wash McLean, A. Y. Smith, and E. W. Bitticks. They are given in detail with the hope that they may serve as suggestions to others contemplating a change to fewer sections of steel.

I quote from letter Mr. Gerald Sherman, consulting engineer, mining department, Phelps Dodge Corporation, has very kindly written on the subject of standardization:

"The principal advantage of standardization is to reduce the quantity of steel necessarily in use and to assist in steel distribution.

"The cross-section of steel now in use is generally confined to round and quarter octagon. The quarter octagon has the advantage that it can be rotated without the necessity of providing lugs, as compared with round, and of providing more wearing surface as compared with hexagonal steel. Its disadvantages are that, from the method of manufacture, it generally has a less perfect hole than the round steel and, through lack of as much working in the rolls, probably is of little poorer quality than the round section.

"While quarter octagon has the advantage of not having to form either collar or lug and thus decreasing the cost of preparing it for use as well as reducing the percentage of breakage, it has the disadvantage that a tappet must be used in the machine which cuts down the drilling speed from 10 to 12 percent and provides no easy method of extraction from the hole if it sticks.

"It seems probable to me that there is not much difference between collars or lugs in causing steel breakage. With quarter octagon steel the resistance to rotation is also greater than in the round section.

"It has been found that lengthening the chuck has a great influence on reducing the breakage of steel, and some companies are now getting stoping machines with longer chucks. I am also told that the use of self-rotating stopers has also reduced the breakage still further. In

the use of jackhammers it has been found that increasing the length of the chuck, which must be done in order to use lug steel, has improved the behavior of the jackhammer considerably when held in the hand. It aligns itself better with the hole and rotates more easily.

"Chuck wear has great influence on breakage, and its effect is also reduced by lengthening the socket.

"When we come to the selection of a particular brand of steel, I doubt if we have much information of value to give you. The difference in hardness between different pieces of steel of the same brand sharpened and tempered by the same man is great enough to make me feel that it would be difficult to show small differences in results between two kinds of steel without much more elaborate tests than we have as yet made. Big differences could be determined without much trouble."

I wish to thank the officials of the different companies who were so kind as to send in descriptions of their practice and to give us their ideas on standardization.

#### HERO MEDAL AWARDED

RECOGNITION of heroism performed on no reeking field of battle but in the ranks of industry is given in the awarding of the hero medal of the Joseph A. Holmes Safety Association to William Culp, who lost his life in a salt mine near Detroit, Mich., while endeavoring to rescue a fellow worker. Culp, a job superintendent, of his own volition lowered himself in a bucket to the depth of a 550-foot shaft on June 15, 1924, in an effort to save the life of an employee who had previously descended the shaft to investigate the breakdown of a pump, and from whom no word had been received due to the failure of the signal system. Culp made an almost superhuman, though unsuccessful, effort to rescue his fellow worker, forcing his way through an accumulation of several feet of water and an atmosphere permeated by deadly gases. After having exhausted his energies in his attempt to rescue the other man, Culp was unable to climb back into the shaft bucket and was drowned.

The hero medals of the Joseph A. Holmes Safety Association are bestowed annually on miners whose acts of courage and self-sacrifice in the succor of their comrades in the stress of mine disasters are considered to be the most deserving of this high honor. The Joseph A. Holmes Safety Association is an organization numbering in its membership thousands of miners banded together for the promotion of safety in mining and constitutes a living memorial to the memory of the first Director of the Bureau of Mines.

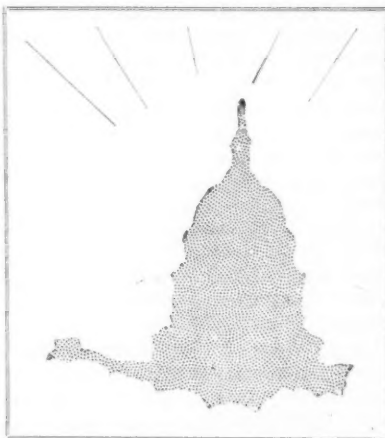
# LEGISLATIVE REVIEW

*As A Record-Breaking Congress Passes Into History, A Thousand Laws Are Left As A Legacy—A Large Number Of Bills Both In Behalf Of And Against The Mining Industry Were Considered, Some Becoming Laws, And Others Failing Of Passage, Chief Among This Latter Class Being The Gold And Silver Commission, And The Silver Purchase Bill*

THE mining industry heaves a sigh of relief, as the celebrated 68th Congress passes into oblivion, leaving behind it approximately 1,000 laws—a record of legislation not exceeded by any previous Congress. This 68th Congress has been in almost continuous session for two years, and in that time proposed and passed 994 laws, which met with approval by the President. Of this number 632 were public laws; 76 were public resolutions and 286 were private laws. During the 67th Congress a total of 550 laws were enacted, and the 66th Congress enacted 400 laws. The thousand laws passed by the 68th Congress by no means lived up to the possibilities, for this famous session actually introduced for consideration, 18,332 measures. Twelve thousand four hundred and seventy-four of these were House bills and 897 House resolutions, while 4,409 were Senate measures, and 552 Senate resolutions.

With this record as its guide, there is no apparent enthusiasm anywhere for the possibility of an extra session of the 69th Congress, even when the purpose for this special session shall be a modification of the tax laws. However, there is a possibility that an extra session may be called to consider revising the tax law and reducing taxes.

This will not be definitely determined until after the government balances its books on July 1, the close of its fiscal year. If the figures show an excess of receipts over expenditures and a probability that this ratio will continue during the succeeding year, the possibility is very strong that the President will call an extra session in order to revise the tax rates and perhaps the administrative features of the revenue law. The program will be drawn up by the House Committee on Ways and Means, which originates revenue legislation, and which contemplates consideration of the question during the present Congressional recess. The committee will confer with Secretary of the Treasury Mellon on probable tax revision, as that official is expected to express the views of the President in prospective tax legislation. If tax revision is undertaken it is presumed effort will be made to have the tax reduction apply to rates on higher incomes in order to induce capital to invest in productive enterprise. It has long been contended by Treasury experts



that the excessive rates on higher incomes prevent capital development and industrial progress and force investors to place their savings in tax-exempt securities.

Interesting developments in the tax situation are expected to follow the conclusions of the special Senate committee of which Senator Couzens, Republican, Michigan, is chairman, which has been investigating the administration of the internal revenue law by the Revenue Bureau. The committee will conclude its investigation proper on June 1 and is expected to present its report at the convening of the next session of Congress.

Senator Oddie, Republican, Nevada, was unable to secure adoption of his resolution for continuance of the Senate gold and silver commission during the new Congress, which began March 5. Senator Oddie introduced a resolution to continue the investigation but when the committee to which it was referred, failed to report it, the Senator sought to discharge the committee from its consideration and to have the Senate vote continuance of the commission. On several occasions when he brought up the question he was met by an objection and the resolution died with the expiration of the Congress on March 4. The President called a special session of the Senate to meet immediately after March 4 and Senator Oddie renewed his efforts by reintroducing the former resolution to continue the work of the commission. The special session ended without acting on the resolution and the commission went

out of existence. In the House an effort was made by Representative Manlove, Republican, Missouri, to have the investigation concluded by a commission to be appointed by the President but no action was taken by the Mines and Mining Committee to which it was referred.

A measure of considerable interest to the mining industry failed of enactment at the recent session. This was the bill directing the Treasury to purchase 14,000,000 ounces of silver at \$1 per ounce under the Pittman Act to cover Pittman Act silver allocated for subsidiary coinage and subsequently revoked by the Treasury. The bill had passed the Senate but its friends in the House could find no opportunity to bring it up for consideration. Senator Phipps, Republican, Colorado, sought to have the bill attached to the last appropriation bill to be considered but it was ruled out of order on an objection by Senator Couzens, Republican, Michigan. This bill, together with other bills which were not completed during the last Congress, must be reintroduced in the new Congress in order to receive further consideration.

Both Senate and House have taken steps to complete the organization of those bodies in order to take up legislation when the next session is held. Representative Nicholas Longworth, Republican, Ohio, has been chosen as the new Speaker of the House of Representatives, succeeding Representative F. H. Gillett, Republican, Massachusetts, who became a Senator on March 4. Representative John C. Tilson, Republican, Connecticut, will be the new floor leader of the House and have charge of the legislative program for that body. Some of the important House committees have been decided on by the leaders. New Republican members on the Ways and Means Committee which will draft the new tax law are Representatives Bixler, Pennsylvania; Faust, Missouri, and Aldrich, Rhode Island. Representative James A. Frear, of Wisconsin, was dropped because of his adherence to Senator LaFollette, and Representative Tilson gave up his membership on the committee in order to become floor leader. Representative Parker, Republican, New York, will be the new chairman of the Interstate Commerce Committee, and additional new Republican members on this committee will be Fred-

## IMPORTANT BILLS REVIEWED IN THIS ISSUE

## MINING—

- S. Res. 16: Oddie (R.), Nev. Gold and Silver Commission.  
 H. J. Res. 380: Manlove (R.), Mo. Gold and Silver Commission.  
 H. R. 4148: Law. Alaska Mine Claims.  
 H. R. 5722: Law. Helium Development.  
 S. 3895: Law. Silver Coinage.  
 H. J. Res. 187: Law. Gold and Silver Coinage.  
 S. 4120: Ransdell (D.), La. Sulphur Leases.  
 H. R. 6713: On Calendar. Coal Trespass.  
 H. R. 12436: Robison (R.), Ky. Mine Rescue Station.  
 H. R. 12435: Kincheloe (D.), Ky. Mine Rescue Station.  
 S. Res. 347: Passed. Land Inquiry.  
 H. R. 11500: Law. Mineral Lands.  
 H. R. 4522: Law. Topographic Survey.

## OIL—

- S. Res. 337: Trammell (D.), Fla. Price Inquiry.  
 H. R. 9199: On Calendar. Pollution Regulation.  
 H. R. 12347: Richards (D.), Nev. Lease Extension.  
 S. Res. 356: Passed. Lease Inquiry.

## TAXATION—

- S. Res. 333: Passed. Revenue Inquiry.  
 H. R. 12300: Law. Refunds.  
 H. R. 12446: Madden (R.), Ill. Refunds.  
 H. J. Res. 371: Ackerman (R.), N. J. 25% Deduction.

## INDUSTRY—

- S. Res. 28: Passed. Trade Associations.  
 S. Res. 34: Passed. Cooperative Associations.  
 H. Res. 453: Mead (D.), N. Y. Railroad Labor Board.  
 H. R. 12418: Hoch (R.), Kans. Railroad Rates.

ericks, California; Robinson, Iowa; Phillips, Pennsylvania, and Garber, Oklahoma.

The Senate has a Vice President as its presiding officer for the first time since August, 1923. Up to this time Senator Cummins, Republican, Iowa, had been the presiding officer of the Senate. The Senate selected Senator Moses, Republican, New Hampshire, as its President pro tem, to act in the absence of the Vice President. The Senate has selected its committees for the new Congress. Those which will consider mining or related matters are as follows:

*Mines and Mining*—Oddie, Nev.; Cameron, Ariz.; Means, Colo.; duPont, Del.; Goff, W. Va.; Frazier, N. D.; Walsh, Mont.; Ashurst, Ariz.; Pittman, Nev.; King, Utah.

*Finance*—Smoot, Utah; McLean, Conn.; Curtis, Kans.; Watson, Ind.; Reed, Pa.; Ernst, Ky.; Stanfield, Ore.; Wadsworth, N. Y.; McKinley, Ill.; Shortridge, Calif.; LaFollette, Wis.; Simmons, N. C.; Jones, N. M.; Gerry, R. I.; Harrison, Miss.; King, Utah; Bayard, Del.; and George, Ga.

*Public Lands*—Stanfield, Ore.; Smoot, Utah; Norbeck, S. D.; Cameron, Ariz.; Spencer, Mo.; Oddie, Nev.; Dale, Vt.; Ladd, N. D.; Pittman, Nev.; Jones, N. M.; Kendrick, Wyo.; Walsh, Mont.; Dill, Wash.; Ashurst, Ariz.

*Banking and Currency*—McLean, Conn.; Weller, Md.; Norbeck, S. D.; Edge, N. J.; Pepper, Pa.; Phipps, Colo.; Sackett, Ky.; Frazier, N. D.; Fletcher, Fla.; Glass, Va.; Edwards, N. J.; Stephens, Miss.; Mayfield, Tex.; Bratton, N. M.; Tyson, Tenn.

*Commerce*—Jones, Wash.; Fernald, Me.; McNary, Ore.; Edge, N. J.; Willis, Ohio; Weller, Md.; Couzens, Mich.; Johnson, Calif.; Bingham, Conn.; Ladd, N. D.; Fletcher, Fla.; Ransdell, La.; Sheppard, Tex.; Simmons, N. C.; Stephens, Miss.; Harris, Ga.; Copeland, N. Y.

*Labor*—Phipps, Colo.; Borah, Idaho;

Couzens, Mich.; Metcalf, R. I.; Bingham, Conn.; Gillett, Mass.; Brookhart, Iowa; Jones, N. M.; Caraway, Ark.; Ferris, Mich.; Copeland, N. Y.; Ralston, Ind.

*Immigration*—Johnson, Calif.; Keyes, N. H.; Willis, Ohio; Reed, Pa.; Means, Colo.; Bingham, Conn.; King, Utah; Harris, Ga.; Harrison, Miss.; Copeland, N. Y.; Blease, S. C.

*Indian Affairs*—Harreld, Okla.; Curtis, Kans.; McNary, Ore.; Cameron, Ariz.; Schall, Minn.; McMaster, S. D.; LaFollette, Wis.; Ashurst, Ariz.; Kendrick, Wyo.; Wheeler, Mont.; Dill, Wash.; Bratton, N. M.

*Interstate Commerce*—Watson, Ind.; Cummins, Iowa; Fernald, Me.; Gooding, Idaho; Couzens, Mich.; Fess, Ohio; Howell, Nebr.; Goff, W. Va.; Pine, Okla.; Sackett, Ky.; LaFollette, Wis.; Smith, S. C.; Underwood, Ala.; Pittman, Nev.; Bruce, Md.; Dill, Wash.; Wheeler, Mont.; Mayfield, Tex.

*Manufacturers*—McKinley, Ill.; McNary, Ore.; Weller, Md.; McLean, Conn.; Metcalf, R. I.; LaFollette, Wis.; Brookhart, Iowa; Smith, S. C.; Reed, Mo.; Edwards, N. J.; Wheeler, Mont.; Tyson, Tenn.

*Patents*—Ernst, Ky.; Norris, Nebr.; Butler, Mass.; Metcalf, R. I.; Shipstead, Minn.; Smith, S. C.; Broussard, La.

## MINING

## Gold and Silver Commission

S. Res. 16. Introduced by Mr. Oddie (Rep., Nev.). Referred to the Committee on Expenses. This resolution proposed to continue for two years after March 4, 1925, the gold and silver commission of which the Senator is chairman. A similar resolution, S. Res. 323, failed of consideration at the session which closed on March 4. Senator Oddie endeavored to have the committee discharged from consideration of the resolution because of its failure to act on the matter, and made a speech in behalf of the commission, but was met by

objections by several Senators, and the Senate adjourned without acting on the matter.

H. J. Res. 380. Introduced by Mr. Manlove (Rep., Mo.). Referred to the Committee on Mines and Mining. This resolution proposed the continuance and conclusion of the gold and silver investigation by a commission of five persons appointed by the President.

## Silver Purchase

Senator Phipps (Rep., Colo.), offered as an amendment to a deficiency appropriation bill, the bill previously passed by the Senate directing the Treasury to purchase 14,000,000 ounces of silver at \$1 per ounce under the Pittman Act. It was ruled out of order on objection of Senator Couzens, Republican, Michigan.

## Alaskan Mines

H. R. 4148. Enacted into law. This law will permit the patenting of fractional parts of mining claims in Alaska. It provides as follows:

That no placer mining claim hereafter located in Alaska shall be patented which shall contain a greater area than is fixed by law, nor which is longer than three times its greatest width as determined by a transverse line drawn within the lines of the claim and at right angles to its longest side: *Provided*, That where any isolated parcel of placer ground lies between and adjoins patented or validly located claims on all of its sides and is not over thirteen hundred and twenty feet in length this dimensional restriction shall not apply.

## Mine Claims

H. R. 11077. Enacted into law. This law authorizes issuance of patents to South Dakota for park purposes, of 2,000 acres of land in the Custer State Park, now claimed under the United States mining laws. The Government reserves their mineral content. South

Dakota is to pay \$1.25 per acre for the land.

#### *Mine Exposition*

S. J. Res. 130. Enacted into law. This law authorizes exhibits by the Bureau of Mines and other Government bureaus at an international exposition to be held at Seville, Spain, in 1927.

#### *Helium Development*

H. R. 5722. Enacted into law. This law provides for the conservation, production and exploitation of helium by the Bureau of Mines. Appropriations of one million dollars have been transferred from the Army and Navy to the Bureau for operations under this law.

Extracts of the law are as follows:

That for the purpose of producing helium with which to supply the needs of the Army and Navy and other branches of the Federal Government, the Secretary of Interior is authorized to acquire land or interest in land by purchase, lease, or condemnation, where necessary, when helium can not be purchased from private parties at less cost, to explore for, procure, or conserve helium-bearing gas; to drill or otherwise test such lands; and to construct plants, pipe lines, facilities, and accessories for the production, storage, and repurification of helium. Any known helium gas-bearing lands on the public domain not covered at the time by leases or permits under the leasing act may be reserved for the purposes of this Act, and the United States reserves the ownership and the right to extract, under such rules and regulations as shall be prescribed by the Secretary of Interior, helium from all gas produced from lands so permitted, leased, or otherwise granted for development.

The Bureau of Mines, acting under direction of the Secretary of Interior, is authorized to maintain and operate helium production and repurification plants, together with facilities and accessories thereto; to store and care for helium; to conduct exploration for and production of helium on and from lands acquired or set aside under this Act; to conduct experimentation and research for the purpose of discovering helium supplies and improving processes and methods of helium production, repurification, storage, and utilization.

On or before June 30, 1925, all existing government plants operated by the government or under lease or contract with it, for the production of helium shall be transferred to the jurisdiction of the Bureau of Mines. Thereafter the Army and Navy and other branches of the federal service requiring helium may requisition it from the bureau and make payment therefor at actual cost of said helium to the United States, including all expenses connected therewith. Any surplus helium produced

may, until needed for government use, be leased to American citizens or American corporations under regulations approved by the President. Money received from the sale or leasing of helium shall be credited to a helium production account and be available for the purposes of this section. Any gas belonging to the United States after the extraction of helium, or other by-product not needed for government use shall be sold and the proceeds deposited in the Treasury.

No helium gas shall be exported from the United States, or from its possessions, until after application for such exportation has been made to the Secretary of Interior and permission for said exportation has been obtained from the President on the joint recommendation of the Secretaries of War, Navy, and Interior. Any person violating any of the provisions of this section shall be guilty of a misdemeanor and shall be punished by a fine of not more than \$5,000 or by imprisonment of not more than one year, or both. Federal courts are granted jurisdiction to try and determine all questions arising under this section.

The Army and Navy may each designate an officer to cooperate with the Department of Interior in carrying out the purposes of this Act, and shall have complete right of access to plants, data and accounts.

#### *Notes for Gold*

H. R. 12453. Introduced by Mr. McFadden (Rep., Pa.). Referred to the Committee on Banking and Currency. This bill proposed to repeal war amendments to the Federal Reserve Act. It would forbid the issuance of federal reserve notes in exchange for gold. Mr. McFadden said the issuance of notes in exchange for gold tends to confusion as to the precise extent to which federal reserve notes are outstanding in aid of commercial requirements. Mr. McFadden said the result of his bill will take out of the currency system a billion dollars of inflation which has been a strong factor in maintaining present high prices.

#### *New Coinage*

S. 3895. Enacted into law. This law authorizes the following coinage:

Forty thousand 50c silver pieces in commemoration of the 150th anniversary of the Battle of Bennington and the independence of Vermont.

Three hundred thousand 50c silver pieces in commemoration of the 75th anniversary of the admission of California as a State.

Three hundred thousand 50c silver pieces in commemoration of the 100th anniversary of the founding of Fort Vancouver, Washington.

H. J. Res. 357. Reported by the Committee on Expositions. This resolution proposes to authorize the coinage of 500,000 one dollar and 50c gold pieces and 1,000,000 50c silver pieces in commemoration of the 150th anniversary of the signing of the Declaration of Independence.

#### *Enacted Into Law*

S. J. Res. 187. This law authorizes the coinage of 200,000 \$2.50 gold pieces and not more than a million silver 50c pieces in commemoration of 150th anniversary of the signing of the Declaration of Independence.

#### *Sulphur Leases*

S. 4120. Introduced by Mr. Ransdell (Dem., La.). Passed by the Senate and reported by the House Committee on Public Lands. Its passage was prevented on objection of Representative Begg, Republican, Ohio. This bill proposed the issuance by the Interior Department of prospecting permits and leases for sulphur. As passed by the Senate it applied only to lands in Louisiana, but it was amended by the House Committee to apply generally throughout the United States.

#### *Coal Trespass*

H. R. 6713. Passed by the House and reported by the Senate Committee on Public Lands. This bill proposed to define and punish trespassers on coal lands of the United States. It provided as follows:

"That it shall be unlawful to mine and remove coal of any character, whether anthracite, bituminous, or lignite, from beds or deposits in lands of the United States, or in deposits or beds reserved to the United States, with the intent to appropriate, sell, or dispose of the same, and every person who shall violate any of the provisions of this Act shall be deemed guilty of misdemeanor and fined not more than \$1,000 or imprisoned not more than one year or both.

"Nothing in this Act, however, shall interfere with any right or privilege conferred by existing laws of the United States."

#### *Mine Rescue Stations*

H. R. 12436. Introduced by Mr. Robison (Rep., Ky.). Referred to the Committee on Mines and Mining. This bill proposed to establish a mine rescue station at Pineville, Ky.

H. R. 12435. Introduced by Mr. Kincheloe (Dem., Ky.). Referred to the Committee on Mines and Mining. This proposed to establish a mine rescue station at Madisonville, Ky.

#### *Land Inquiry*

S. Res. 347. Introduced by Mr. Cameron (Rep., Ariz.). Passed by the Senate. This resolution authorizes the

Senate Committee on Public Lands to investigate during the first session of the present 69th Congress, all matters relating to national forests and the public domain, including grazing lands, forest reserves, and other reservations, and lands withdrawn from entry, and their administration.

#### Mineral Lands

H. R. 11500. Enacted into law. This law authorizes exchange of mineral lands in national forests for other lands, in order to consolidate national forest lands. It provides as follows:

"Either party to an exchange may make reservations of timber, minerals, or easements, the values of which shall be duly considered in determining the values of the exchanged lands. Where reservations are made in lands conveyed to the United States the right to enjoy them shall be subject to such reasonable conditions respecting ingress and egress and the use of the surface of the land as may be deemed necessary by the Secretary of Agriculture; where mineral reservations are made in lands conveyed by the United States it shall be so stipulated in the patents, and that any person who acquires the right to mine and remove the reserved deposits may enter and occupy so much of the surface as may be required for all purposes incident to the mining and removal of the minerals therefrom, and may mine and remove such minerals upon payment to the owner of the surface for damages caused to the land and improvements thereon: *Provided*, That all property, rights, easements, and benefits authorized by this section to be retained by or reserved to owners of lands conveyed to the United States shall be subject to the tax laws of the States where such lands are located."

#### Topographic Survey

H. R. 4522. Enacted into law. This law authorizes the completion of the topographic survey of the United States during the next twenty years at an estimated cost of more than thirty million dollars. The bill appropriates \$950,000 to be available until June 30, 1926. The survey is said to be necessary to permit mining and oil developments, among other purposes.

#### OIL

##### Price Inquiry

S. Res. 337. Introduced by Mr. Trammell (Dem., Fla.). No committee reference. This resolution proposed an investigation by the Federal Trade Commission into recent increases in gasoline prices. It sought to ascertain if producers and wholesalers of gasoline maintained a monopoly or combination in restraint of trade or commerce and in violation of law. It directed the Commission to punish such monopoly or trust and to dissolve it should it be de-

termined that producers and sellers of gasoline maintained such monopoly.

Senator Trammell had the Senate pass a resolution calling on the President for a report made by the Commission last year on the oil situation, which report was sent to the Senate.

H. J. Res. 368. Introduced by Mr. McDuffie (Dem., Ala.). Referred to the Committee on Interstate Commerce. This was similar to the Trammell investigating resolution.

S. Res. 31. Introduced by Mr. Trammell (Dem., Fla.). No committee reference. This resolution, introduced in the special session of the Senate, was similar to the foregoing resolution, and directs the Federal Trade Commission to investigate and report to the Senate on the following:

First. The very material advances recently made in the price of crude oil, gasoline, kerosene, and other petroleum products and whether or not such price increases were arbitrarily made and unwarranted.

Second. Whether or not there has been any understanding or agreement between various oil companies or manipulations thereby to raise or depress prices, or any conditions of ownership or control of oil properties or of refining and marketing facilities in the industry which prevent effective competition.

Third. The profits of the principal companies engaged in the producing, refining, and marketing of crude oil, gasoline, kerosene, and other petroleum products during the years 1922, 1923, 1924, and 1925, and also such other matters as may have bearing upon the subjects covered by the provisions of this resolution.

The resolution will be the unfinished business when the Senate reconvenes.

#### Pollution Regulation

H. R. 9199. Passed by the House. Reported by the Senate Committee on Commerce. Senator Ransdell, Democrat, Louisiana, sought action on the bill the day before Congress adjourned, but Senator King, Democrat, Utah, objected on the ground that the measure conferred too much power on the War Department. It sought to forbid the discharge of oil from wells, terminals, refineries, tanks, or storage places into navigable rivers.

#### Lease Extension

H. R. 12347. Introduced by Mr. Richards (Dem., Nev.). Referred to the Committee on Public Lands. This bill amends the leasing law by providing that in cases where lands covered by prospecting permits are situated in any unproven oil field and the permittee has drilled a well thereon to a depth of at least 500 feet, the Secretary of Interior may, upon proof of such drilling and a showing of good faith by the permittee, extend the time for further compliance with the terms of the permit for such

time as he may deem necessary, in excess of the three years previously provided.

#### Lease Inquiry

S. Res. 356. Introduced by Mr. Walsh (Dem., Mont.). Passed by the Senate. It provides for investigation by the Senate Public Lands Committee as to claims of the Honolulu Consolidated Oil Co. to lands in Naval Oil Reserve No. 2.

#### TAXATION

##### Revenue Inquiry

S. Res. 333. Adopted by the Senate. This resolution authorizes the continuance of the investigation of the Internal Revenue Bureau by the special committee of the Senate of which Senator Couzens, Republican, Michigan, is chairman. It provides that the committee shall conclude its hearings and withdraw its representatives from the Revenue Bureau by June 1, after which time it cannot withdraw files from the Bureau. The committee is to report to the Senate at the next regular session of Congress.

H. R. 12300. Enacted into law. This law, covering tax refunds, provides:

"If the taxpayer has, on or before June 15, 1925, filed such a waiver in respect of the taxes due for the taxable year 1919, then such credit or refund relating to the taxes for the taxable year 1919 shall be allowed or made if claim therefor is filed either on or before April 1, 1926, or within four years from the time the tax was paid. If any such waiver so filed has, before the expiration of the period thereof, been extended either by the filing of a new waiver or by the extension of the original waiver, then such credit or refund relating to the taxes for the year in respect of which the waiver was filed shall be allowed or made if claim therefor is filed either within four years from the time the tax was paid or on or before April 1, 1926, in the case of credits or refunds relating to the taxes for the taxable years 1917 and 1918, or on or before April 1, 1927, in the case of credits or refunds relating to the taxes for the taxable year 1919."

#### Tax Refund

H. R. 12446. Introduced by Mr. Madden (Rep., Ill.). Referred to the Committee on Ways and Means. This bill proposed to return to taxpayers surpluses which may exist in the Treasury at the end of the fiscal year. It provides that if at the beginning of any fiscal year the President finds that the receipts of the preceding year exceed the expenditures during such year, he shall determine the amount of such excess and if he finds that there is a surplus for that year which will not be needed to meet ordinary government expenses, he shall proclaim that fact, and the amount of surplus which can be refunded. The President will state what percentage that amount bears to the total amount of in-

come taxes shown by returns filed during the fiscal year in which the surplus occurs. Each taxpayer would be entitled to an allowance either as a cash refund or credit on unpaid installments of unpaid taxes, on the basis of the percentage of his income tax during the year in which the surplus occurs. Refunds of this character would only be authorized in case the surplus was more than \$50,000,000. Illustrating the effect of his proposal, Mr. Madden said: "Suppose the President found that there was a surplus of \$100,000,000 of which \$75,000,000 would not be necessary for governmental expenditures. He would then obtain the aggregate amount of all income taxes shown upon returns filed during the fiscal year in which this surplus accumulated. We will assume this amount to be \$1,500,000,000. The amount to be refunded (\$75,000,000) is 5 percent of the aggregate amount shown by the tax returns—\$1,500,000,000. An individual who made a return of \$200 in tax would be entitled to an allowance of \$10 either by credit or refund." Mr. Madden stated that a distribution of a surplus of \$50,000,000 would amount to an average refund or credit of \$10. Mr. Madden said that this plan will not interfere with tax revision which the President or Congress might consider advisable. It would be a means toward that end by furnishing authority under which relief could be immediately granted while waiting for tax revision. "It provides a simple method by which those who bear the burden of the taxes may occasionally get a dividend check," said Mr. Madden.

H. J. Res. 371. Introduced by Mr. Ackerman (Rep., N. J.). Referred to the Committee on Ways and Means. This bill proposed to grant an additional 25 percent deduction on income taxes for 1924.

## INDUSTRY

### Trade Associations

S. Res. 28. Introduced by Mr. McKellar (Dem., Tenn.). Passed by the Senate. It directs the Federal Trade Commission to report at the next session on open price association. The report calls for the names, membership, nature and importance of the associations in the industries they represent; their effect in maintaining uniform prices to wholesalers or retailers or in securing uniform increases in prices; and whether these associations are engaged in activities in violation of antitrust laws.

S. Res. 34. Introduced by Mr. Shipstead (F. L., Minn.). Passed by the Senate. It calls for an investigation and report by the Federal Trade Commission into the growth and importance of cooperative associations, including particularly the costs of marketing and distribution of such cooperatives as compared with the corresponding costs of

other types of distributors, and into the extent and importance of the interferences with and obstructions to the formation and operation of cooperative organizers of producers, distributors, and consumers by any corporation or trade association in alleged violation of the antitrust laws, and to report thereon with recommendations for legislation, or other remedial action if necessary.

### Power Regulation

S. 4391. Introduced by Mr. Norris (Rep., Nebr.). Referred to the Committee on Interstate Commerce. This proposed to regulate interstate commerce in electric power. It provides that when power on projects developed under the Federal Water Power Act enters interstate or foreign commerce, the rates therefor shall be regulated by the Water Power Commission, if not regulated by the States into which the power is sold.

### War Profits

H. J. Res. 377. Introduced by Mr. Eagan (Dem., N. J.). Referred to the Committee on Rules. It proposed to eliminate completely all profit during war. It proposed a commission to consider the subject on which would be a representative of industry, agriculture, and labor in addition to members of the House and Senate Military Committees and army and navy officers. The bill proposed \$100,000 for expenses of the commission, which is to comprehensively calculate resources, industries, and man power for national defense. The commission is to obtain the views of industry, commerce, and labor on the proposal to eliminate profit from war. It is proposed that on declaration of war all industries and resources of the country shall be mobilized under a civilian general staff. The commission is to report not later than December, 1926.

### Alien Property

H. R. 12244. Introduced by Mr. Hawes (Dem., Mo.). Referred to the Committee on Interstate Commerce. This proposed the return of property now held by the Alien Property Custodian.

S. J. Res. 121. Introduced by Mr. Dial (Dem., S. C.). Indefinitely postponed. Proposed to create an alien property trade investment corporation with \$150,000,000 capital, to sell raw materials and other products to Germany.

S. 2679. Reported by the Committee on Patents. This proposed to revise the trade-mark laws.

H. R. 12443. Introduced by Mrs. Nolan (Rep., Calif.). Referred to the Committee on Labor. This bill proposed to establish a national system of public employment offices under the Department of Labor.

### Railroad Labor Board

H. Res. 449. Introduced by Mr. Mead (Dem., N. Y.). Referred to the Commit-

tee on Rules. This resolution proposed appointment of a committee of seven Representatives to investigate the Railroad Labor Board, including its expenditures and its failure to expedite pending cases. The investigation would cover the question as to whether certain members are disqualified from service thereon.

H. Res. 453. Introduced by Mr. Mead (Dem., N. Y.). Referred to the Committee on Rules. This resolution was similar to the foregoing, except that the investigation would be conducted by the Committee on Interstate Commerce and would cover the "failure of the board to protect the interests of the public." The resolution pointed out that the board has before it cases which were filed in October, 1922. The resolution further points out that certain members of the board are incompetent and inefficient, have neglected their duties and have used government funds for other than government business. The resolution also charges that a member of the board is connected in a business way with a corporation dealing with railroad supplies and that he has been paid by the corporation for services rendered contrary to law. The resolution also says a member of the board has delegated his authority to minor employees of the board to prepare decisions on important complaints in violation of his oath. A member of the board is charged with neglect of duty by failing to attend at least one-fourth of the executive sessions of the board last year, which delayed the disposition of hundreds of important cases. Members of the board are charged with having accepted invitations to banquets by railroad officials at points distant from its headquarters at Chicago, involving expenses paid by the government.

### Rail Rates

H. R. 12418. Introduced by Mr. Hoch (Rep., Kans.). Referred to the Committee on Interstate Commerce. This bill amends the Interstate Commerce Act regarding long and short hauls by providing as follows:

"No common carrier shall be authorized to charge less for a longer than for a shorter distance for the transportation of passengers or of a like kind of property over the same line or route in the same direction, the shorter being included within the longer distance, on account of water competition; Provided, That such authorization, on account of water competition, as may be lawfully in effect at the time of the passage of this amendatory act shall not be required to be changed except upon the further order of the Commission. And provided further, That the provisions of this paragraph shall not apply to rates on import or export traffic, including traffic coming from or destined to a possession or dependency of the United States."

# THE NATION'S VIEWPOINT



**T**HE President's outspoken statement concerning the unfairness of inheritance and estate taxes has called forth considerable comment. In a recent address the **Honorable Charles S. Dewey, Assistant Secretary of the Treasury**, said:

"There is no question of the fact that we must reform the tax system in such a way that business and industry shall not be hampered in their normal, healthy development. But most of all we must make sure that American citizens shall not be deprived of the incentive to work and accumulate and that this country shall not cease to be a land of opportunity. A tax system which penalizes the creative spirit and discourages initiative cannot be the right system for America."

Supporting the President's statement that "collection of any taxes which are not absolutely required is only a species of legalized larceny," the *Wall Street Journal* editorially has the following to say:

"Private property is the most fundamental institution of our economic and of our political order. It is the cornerstone of all real civilization. We may disagree as to when, where or how it originated. It matters not whether we agree that it is a natural right; the fact remains that our society is founded upon it. No other system ever could minister to human progress as this, and in organized society we recognize the absolute right of the individual to the fruits of his toil.

"The Government has no right to the wealth possessed by an individual. As the Government exists for the protection of society and by the consent of the people, it has the right to assess each individual with his private share of the cost of main-

taining that government. This is for the public weal. But that right is limited to the necessary expenses of the Government.

"That one sentence of President Coolidge strikes with peculiar force at this time. It shows the abuse of the taxing power and waste of the proceeds, even though made legal, is on the same plane as larceny or highway robbery. 'Legalized larceny' is a phrase to be remembered."

The recent survey, which disclosed the alarming rate of criminality in this country, brought forth from the **Honorable William E. Borah, Senator from Idaho**, the following statement on the floor of the Senate:



"Parting Is Such Sweet Sorrow"

"If there is any one question which is of deep concern from a domestic standpoint to the people of the United States now, it is that of enforcement of the law. It perhaps ought not to be said without some degree of reluctance, but the facts and figures show that at the present time we are the most disregardful people of law in the civilized world. The American Bar Association appointed a committee a year or so ago to make an investigation of lawlessness in the United States and the disregard of law upon the part of the people of the United States. That committee submitted a report. No man can read that report without realizing that the question of enforcing the law is the

most serious problem with which the Federal Government and the state governments are now confronted. Obedience to the law because it is law is the fundamental principle upon which this Government rests."

The President's recent declaration again affirming his position in regard to a permanent court of international justice has revived interest in this subject. The **Honorable Theodore E. Burton, member of the House of Representatives from Ohio**, believes that:

"The current of popular opinion in this country shows that there is no proposition now pending before the American people more unanimously endorsed than our adherence to the world court. There are divers ways of settling disputes between nations. By arbitration, which I would not decry, for we have been a party in many of these arbitrations as disputants or as judges. By commissions of inquiry, under which the commission is to find merely the facts and the law, thereby bringing to bear the public opinion of the

world and giving time for calm, dispassionate consideration. By commissions of inquiry, as in the Alaskan boundary case. All these have been adopted, with a greater or less degree of success. But the court in its possibilities transcends them all. It is based on the idea that controversies between nations shall be settled as they are now between individuals. It is superior to arbitration, because arbitration is almost always based, in large degree, upon compromise."

During the discussion of the appropriation bills and with particular reference to the item referring to the Alaska Railroad Commission, the **Honorable John E. Raker**, member of the House of Representatives from California, urged the Government to develop the coal lands of the Territory, saying in part:

"There has been a great many million dollars spent for the building of the railroad in Alaska. There has been a great deal of money spent for its upkeep. It is government property, owned and operated by the United States. We passed legislation that would open up the coal fields of Alaska to give revenue to this railroad. We have appropriated money of the Federal Government to develop a naval reserve of coal which we keep in Alaska. That money has not been used and the work has ceased. Private individuals have not been given an opportunity to develop the coal in Alaska as they should. Some weeks ago, and back before that, I had the last shipment in my office of hard coal from Alaska, the character and kind of which has been analyzed by the various departments, and it is equal to, if not excelling, the finest hard coal of Pennsylvania or West Virginia. We are shipping coal to Alaska from the eastern coast. We are shipping coal from the center of the United States to Alaska for government use, instead of building up and developing the coal fields of Alaska to the interests of the United States and the people generally, and we are allowing this Federal-owned railroad to be hungry for money to keep it up and running in order to develop our property. I hope that those in charge of Alaska and the Alaska Railroad and its development will see that these coal fields of Alaska will be developed so that the coal may be used and the railroad may be made a success, as it surely will be if we permit it to proceed."

The "coal problem," which has been so frequent a basis for editorial comment, shows no sign of diminishing in popularity, with the failure of the coal operators of the central competitive field to secure a reduction in the union wage scale. *The American Metal Market*, in a recent issue, states:

"Thirteen months ago the union operators signed up for a continuance of the high wage scale for three years, to April 1, 1927. It was no secret at the time that those who insisted upon the agreement, i. e., the United Mine Workers and the United States Government, did not expect

of Representatives from Tennessee, epitomizes the appropriation bills that have been before the Sixty-Eighth Congress and concludes his statement as follows:

"There has been much said within the last year as to the economy being practiced by the administration. Statements have been broadcasted to the country over and over again showing small savings here and there, but there has been nothing said of the larger increases in expenditures which have been made in many of the departments and establishments of the Government, and the increases caused by the appointment of various commissions and new commitments. Declarations, even though made by the President, avail nothing unless those acting under him and over whom he has control exercise that economy which the interest of the people demands. No one can analyze the appropriations for the past several years without coming to the inevitable conclusion that there would have been no reductions, but on the contrary large increases, had it not been for the fact that war-time agencies and activities have been disappearing. Such an analysis will show without possibility of question that the cost of the ordinary, daily, peace-time operation of the Government is steadily increasing. I repeat that the reduction of the cost of the ordinary peace-time activities of the Government is essential for the relief of the people from their present burdens of taxation and is the acid test of true economy."



Richmond (Ind.) Palladium.  
What's Wrong Here?

the matter to work out smoothly during the three years, by all producers mining coal and avoiding loss, but did expect the matter to work out by many union mines being eliminated by failing and by many union miners being eliminated by their seeking other employment. It is now clear that with one year of the three years passed matters have not even begun to work out that way. The strong union mines have suffered with the weak ones. If they have avoided losses or have had small losses that has been due to fortuitous circumstances. The Pittsburgh Coal Company, for instance, had a lucky speculation in buying a million tons of Kentucky coal which it resold at a profit. That does not settle anything, but rather the reverse."

In a statement released to the newspapers of the country, the **Honorable Joseph W. Byrns**, member of the House

With the possibility that the President will call an extra session of the Sixty-ninth Congress to consider further reduction in our taxes, interest is centered upon the attitude of various members of Congress, particularly the House of Representatives, toward further reducing the nation's taxes. In a speech at the close of the Sixty-eighth Congress, the **Hon. Martin B. Madden**, member of the House of Representatives from Illinois, in summing up the appropriations authorized by the Sixty-eighth Congress said:

"There is much to be considered in connection with tax revision and tax reduction. It should be borne in mind that we have come very close to the bottom in the matter of reduction in government expenditures, and that from now on in all probability we may look for slight increases instead of



*Detroit News*  
Showing How Millionaires Always  
Stick Together



*Washington (D. C.) Evening Star*  
Babes In the Wood



*N. Y. Evening Post*  
Fed Up

further reductions. The country is growing in population and in its interests, and business of the nation, both foreign and domestic, is expanding, and with a prosperous future it is not unreasonable to expect that the expenditures of the government will go normally forward. As industry and the individuals of the country prosper the revenue of the government should increase and keep pace with the normal increase in expenditures once we have eliminated by tax reduction the surplus which it is now believed will eventuate under present tax laws. When taxes are further reduced it should be the duty of the administration and Congress to see to it that new burdens of expenditure through additional legislation are not laid in such sums as to force the necessity of again revising the tax rates upward. The earnest and thoughtful cooperation of every business organization and individual is needed to keep government expenditure within sane and reasonable limits. The government should not be importuned, on the one hand, to lower taxes and relieve taxpayers and, on the other hand, be urged by those same taxpayers to assume new obligations of expenditure by which they will be largely aided by the entrance of the government into that field of expenditure."

Still further along the line of tax reduction, the Hon. A. W. Mellon, *Secretary of the Treasury*, in an address delivered to the Bankers' Club of Richmond, Va., on March 17, said:

"From the Sixty-eighth Congress there emerged the Revenue Act of 1924. This act abolished some taxes, reduced some rates, and followed in the main the recommendations of the Treasury as to administrative changes. In its failure to reduce the maximum surtax below 40 percent and in its increase of estate taxes to a maximum of 40 percent, the revenue act violated certain principles of taxation which I feel to be fundamental to any sound reform of the tax system. This may be tax reduction. It is not tax reform. This may impose high rates on large incomes and estates. It does not insure continuation of large revenue to the government. This may seem to make wealth pay. It only overburdens industry and initiative."

"We are still faced then with the necessity of establishing economically sound rates of tax. But we are in a better position today to make the reform comprehensive than we were in 1923."

"As the cost of government, particularly that of the states and municipalities, has mounted in the past few years, there has arisen the necessity for an apportionment of the fields of taxation between state and federal governments."

"An unintelligent use of the taxing power may have disastrous consequences. It is for this reason that we must come to some understanding, particularly as regards high surtaxes and in the field of inheritance taxes, by which overlapping and unfair taxes shall be eliminated and the future welfare and prosperity of the country shall be assured."

In discussing the workmen's compensation measure for the District of Columbia, the Hon. Charles L. Underhill, member of the House of Representatives from Massachusetts, in a speech on the floor of the House, said:

"At the convention of the American Federation of Labor at Portland, Ore., in October, 1923, the executive council made the following unexpected and surprising report condemning bureaucracy and governmental interference:

"The largest freedom of action, the freest play of individual initiative and genius in industry cannot be had under the shadow of constant incompetent government interference,



*N. Y. Evening Post*  
Blown Over At Last

meddlesomeness, and restriction. The continuing clamor for extension of state regulatory powers under the guise of reform and deliverance from evil can but lead to greater confusion and more hopeless entanglement.

"The ruthless drive of purely individual aim and ambition has given America tremendous industrial giants. Great abuses have accompanied great achievements. But what is frequently overlooked is the fact that ambition to build has been the driving force behind our most remarkable strides. The abuses, terrible and costly as they have been, have been largely coincidental.

"Our people cannot live and thrive under the regime of bureaucracy that threatens."

"This sound doctrine was later repudiated by some of the labor leaders, including the president of the American Federation of Labor, who after years of opposition to the radical element indorsed the government insurance plan. No organization in the history of the country has ever suffered such a severe repudiation by the people as the American Federation of Labor, which was made by a tail to the communist kite in the last presidential election.

"The rank and file of labor want protection for themselves and families, the right to work when and where and for whom they please without coercion or control by outsiders. That is why less than 10 percent of labor belongs to labor unions. The labor organizers, business agents, and legislative delegates must make a noise. Their job depends upon the dissatisfaction of the workers. They would set class against class. They would curtail private rights and enterprise. They would kill enthusiasm and assassinate ambition. Their effort is to make trouble for the employer and the employee, and to make both suffer."

The country has watched and is watching with keen interest the Hon. William Green, new president of the American Federation of Labor. In discussing the problem of labor and management for the Harvard Union, Harvard University, Mr. Green made the following interesting statements:

"The outstanding and primary factors in all indus-

trial enterprises are capital and labor. Both are essential in industry and each is dependent upon the other. Between them there is an interdependence so fixed and irrevocable as to make complete success attainable only through understanding and co-operation.

"To accept the doctrine that the establishment of right relationship between employers and employees is impossible of attainment means that justice and righteousness have been dethroned and that instead of refinement through education and the development of a keen sense of justice and intellect we still recognize the law of the primitive, the rule of force, where only might makes right.

"The assurance of complete success through the medium of collective bargaining must be predicated upon a mutuality of interest in industry. A positive understanding must be reached providing for a proper regard and a just recognition of the rights of all concerned.

"The right of employers to control, direct and manage industry and to receive a fair return upon invested capital must be willingly conceded. A spirit and purpose to follow the right and to do the right, to take no unfair advantage, to practice no trickery or deceit, to neither threaten nor coerce,

should govern the representatives of employers and employees in all wage negotiations and conferences. Through such reciprocal relationship the common problems of industry can be solved, efficiency in service promoted, and economies in production introduced.

"The new idea of joint responsibility is approaching the solution of industrial problems on the part of the employers, management, and employees is being tried in various lines of industry."

Urging that there should be more cooperation instead of competition in business, Mr. Richard F. Grant, president of the United States Chamber of Commerce and vice-president of the M. A. Hanna Company, of Cleveland, in an address before the Chicago Association of Commerce, said:

"Because the welfare of all is interwoven, every man, woman, and child have become a part of us. We can't play solitaire any longer. All the major problems of community life must become the problems of every business man who is doing his duty to himself and his country. Business does not exist for itself alone; it must exist for the common good and must so be visualized. No business can be good business unless it is designed and operated for the good of all.

"I do not concede that business is a sordid affair because of the fact that it provides for the very material wants of mankind. There is one sure thing about our present business system; it works and it does provide for the material needs of mankind. It is a natural human tendency to tinker and fuss with something that works well. This tendency is usually overpowering with those who know little or nothing about fine machinery. Small boys like to put tacks in watches or remove wheels from a sewing machine. And there are small boys and big boys who would like to throw government ownership and government management and government interference with management and restrictions on investment and other repressive spikes into the business machine.

"If clear thinking has once established the facts and we know what the machine is for and what it will do, we will



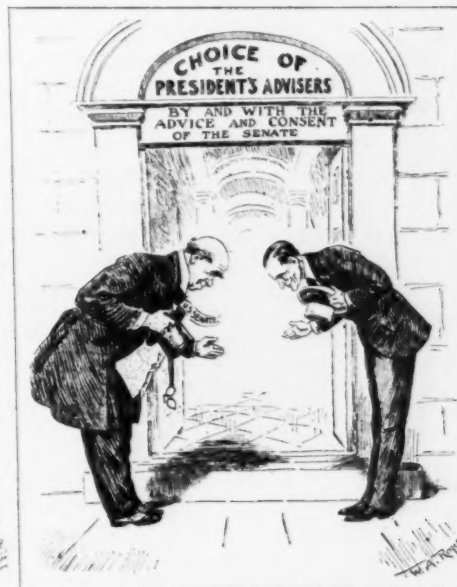
© The N. Y. Tribune Syndicate.  
The Weaning Season



N. Y. Tribune  
Covering Altogether Too Much Territory



N. Y. Evening Post.  
Something Coming to Him



Washington (D. C.) Post  
"After You, My Dear Alphonse"

be rather slow about permitting anyone to throw any spikes into this machine which works and which does provide for the needs of mankind."

Protesting against the higher freight rate for the short haul as against the long haul, the Hon. Frank R. Gooding, United States Senator from Idaho, said:

"Mr. President, freight rates are taxes which the people must pay for the use of the railroads. When the government levies a tax upon the people or authorizes a corporation to levy a tax upon the people it should be a fair tax, a just tax, a tax without discrimination. Why our own government should force the people of the interior to pay a higher freight rate than that paid by those who are blessed with water transportation is hard for me to understand.

"For nearly 50 years the people of the West have been battling against this discrimination; for 50 years the people of the West have been asking for justice, and yet there has been given to them only violation after violation of the law governing freight rates, until they have no opportunity practically to be anything except farming communities. All that we ask for in

the West is a place in the sun, a place in this great country of ours, and opportunity to help make it a bigger and better country, and to enjoy the same rights and privileges that other citizens enjoy.

"Under the present discrimination in freight rates the interior states of the West are practically at a standstill in their growth and development.

"If this country is to reach its full greatness as a nation we must have other Pittsburghs and other Chicagos and other Detroits, as well as many other great cities I might mention east of the Mississippi.

"The great State of Utah can properly be called the Pennsylvania of the West. Out in that great state it is safe to say that they have more coal than exists in the great State of Pennsylvania; they have great iron mines,

great copper mines, great silver and lead mines, and every other kind of mineral known to civilization; yet, with discrimination in freight rates, there is no hope for any manufacturing industries to any extent in the State of Utah, and what is true in Utah is true in other interior states in the West.

"Out there in the mighty West we have most all the standing timber that is left in America today. Out in the West, the Northwest, and the Southwest we produce practically all of the precious metals and copper in America. Out in the West, the Northwest, and the Southwest we have practically all of the oil supply that is left in America; and out there in the West, the Northwest and the Southwest we have an opportunity to develop more hydroelectric power several times over than is possible in all of the rest of the states of the Union combined; yet through a discrimination in freight rates we have no opportunity to manufacture any of our raw materials into the finished products.

"The West is made up of some of the best blood of every state in the Union. Its people are a great people; they are a progressive people. All they want is 'a place in the sun' and a chance to make this a bigger and better country."



Cinderella, the Stepsister, Steps Out

N. Y. Times



### New Blue Sky Law Enacted In Utah— Unanimous Vote In Both Houses

Utah's Blue Sky Law is practically rewritten in a bill passed by the last legislature and approved by Governor Dern, March 16th. The general effect of the new law is to reduce the requirements on established companies and seasoned securities very materially. Exemptions are somewhat amplified and qualification of securities by notification is provided. Another new feature is the provision for court review of orders of the Securities Commission. Under the new law no licenses or other evidences of the Commission's action are issued to stock salesmen. Salesmen are forbidden to refer to the Securities Commission in any way in connection with a sale. Members and employees of the Commission are not permitted to indorse in any way any proposition considered by the Commission and are forbidden to accept gifts of stock or other gratuities.

The State Securities Commission was the subject of investigation by a special committee of the Utah House of Representatives at the late session of the legislature. The new law is designed to meet conditions and practices under the old law which the committee did not approve. The new law was supported by the investigating committee; in fact, it passed both houses of the legislature unanimously.

### Utah Legislators Inspect Mines

Members of the Utah legislature were guests of the Utah Chapter, American Mining Congress, on a visit to the mines at Bingham and the reduction works at Garfield, Utah, on March 13th, the day following adjournment of the legislature. More than half of the total membership of the legislature accepted the invitation. Luncheon was served to the guests in the new hotel of the United States Smelting, Refining & Mining Company at Bingham and surface workings of various mines were inspected. The legislators were unanimous in expressing their appreciation of the benefit and knowledge they derived from the trip. Several officers and directors of the Chapter accompanied the party.

### A. I. M. E. Meeting

The one hundred and thirty-first meeting of the American Institute of Mining and Metallurgical Engineers was held in

New York, February 16 to 20, with the largest registration of any previous meeting. The technical sessions were more largely attended and aroused more discussion than ever before.

There were joint meetings with Mining Section of the National Safety Council, under the auspices of the Industrial Relations Committee of the Institute, and two important lectures—the Howe Memorial Lecture, under the auspices of the Iron and Steel Committee, and the lecture by Dr. Carl Benedicts, of Sweden, on Corrosion, under the auspices of the Institute of Metals Division. The Petroleum Division conducted its annual Symposium on Oil.

J. V. W. Reynders, of New York, was elected president, to succeed William Kelly, of Iron Mountain, Michigan. Mr. Reynders was previously vice-president of the Institute. Among other things he has recently built the high bridge across the Hudson river at Poughkeepsie. E. De Golyer was elected first vice-president; F. F. Sharpless, secretary; and Percy E. Barbour, assistant secretary.

### Rocky Mountain Coal Mining Institute Meeting

The twentieth annual meeting of the Rocky Mountain Coal Mining Institute was held in Denver, February 16, 17 and 18. Discussions of mine safety and rock dusting methods occupied the best part of the sessions.

John B. Marks, of the Colorado Fuel & Iron Co., was elected president; H. H. Bubb, general superintendent of the American Smelting & Refining Co., at Cokedale, vice-president for Colorado; W. J. Reid, of the Lion Coal Co., vice-president for Utah; Gomer Reese, of the Kemmerer Coal Co., vice-president for Wyoming; William Moorehead, of the Phelps-Dodge Corp., vice-president for New Mexico; and Benedict Shubart, secretary-treasurer.

### Plan Superpower Plant in Pennsylvania Coal Fields

Establishment of a giant power generating station in Pennsylvania, regulation of future electrical development and steps to bring about reductions in electrical rates by indicating methods of economy in generation are recommended in the report of the Giant Power Survey Board submitted to the general assembly by Governor Pinchot. The plan con-

templates the erection of a coal-distillation plant capable of pretreating all the coal mined, using the high-grade product for domestic and industrial fuel and pulverizing the balance for the production of power. The plant would be located within a reasonable radius of mines having a combined capacity of 25,000 tons a day for not less than 50 years.

The statement is made that the sale of by-products is estimated to cover operating expenses and fixed charges of such a fuel-treating plant. An estimate of cost of such an undertaking is as follows: Coal treatment plant, \$34,000,000; power plant (\$70 per kw.), \$34,909,000; trunk line transmission, \$14,950,000, or a total cost of \$83,859,000.

### Superpower Survey Being Made in Illinois

Coincident with the above Pennsylvania superpower project is the survey being made in Illinois by C. M. Rau, Pennsylvania engineer, for a similar project, contemplated by Frank Farrington, president of the Illinois Mine Workers. Mr. Rau plans to make a preliminary survey of the coal industry first as a step toward determining the feasibility of the project, and expects to make recommendations soon.

### U. M. W. Says Non-Union Miners Will Strike At Their Request

In a statement issued at Fairmont, W. Va., by Van A. Bittner, representative of the United Mine Workers in that field, the prediction was made that the union would call a general strike on April 1, requesting every man working in the non-union mines to join the United Mine Workers. His statement reads: "The United Mine Workers of America will issue a general strike call requesting every man working in the non-union mines of Northern West Virginia to join the U. M. W. and strike on that date."

"The miners' organization has prepared plans to make this strike effective and it is the launching of the real offensive to organize every coal mine in Northern West Virginia. There can be no doubt that the men working in the non-union mines will respond to the strike call."

### May Repeal Pennsylvania Anthracite Tax—Hudson Coal Appeals Taxes

The bill introduced in the Pennsylvania Legislature repealing the anthracite tax law has been reported out affirmatively by the House Mines Committee and is back in the Ways and Means Committee. The members of the Mines Committee as well as the members of the Legislature from the anthracite counties favor the passage of this measure.

Since no means has been provided for making up the \$6,000,000 or more a year that the law yields to the state, and as the Ways and Means Committee must attend to the revenue that the Appropriations Committee intends appropriating, the bill was recommitted "for study."

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# NEWS OF THE MINING FIELD

*A Résumé Of The Activities Of The Mining Industry And Items Of Interest In The Field*

## **New Blue Sky Law Enacted In Utah— Unanimous Vote In Both Houses**

Utah's Blue Sky Law is practically rewritten in a bill passed by the last legislature and approved by Governor Dern, March 16th. The general effect of the new law is to reduce the requirements on established companies and seasoned securities very materially. Exemptions are somewhat amplified and qualification of securities by notification is provided. Another new feature is the provision for court review of orders of the Securities Commission. Under the new law no licenses or other evidences of the Commission's action are issued to stock salesmen. Salesmen are forbidden to refer to the Securities Commission in any way in connection with a sale. Members and employees of the Commission are not permitted to indorse in any way any proposition considered by the Commission and are forbidden to accept gifts of stock or other gratuities.

The State Securities Commission was the subject of investigation by a special committee of the Utah House of Representatives at the late session of the legislature. The new law is designed to meet conditions and practices under the old law which the committee did not approve. The new law was supported by the investigating committee; in fact, it passed both houses of the legislature unanimously.

## **Utah Legislators Inspect Mines**

Members of the Utah legislature were guests of the Utah Chapter, American Mining Congress, on a visit to the mines at Bingham and the reduction works at Garfield, Utah, on March 13th, the day following adjournment of the legislature. More than half of the total membership of the legislature accepted the invitation. Luncheon was served to the guests in the new hotel of the United States Smelting, Refining & Mining Company at Bingham and surface workings of various mines were inspected. The legislators were unanimous in expressing their appreciation of the benefit and knowledge they derived from the trip. Several officers and directors of the Chapter accompanied the party.

## **A. I. M. E. Meeting**

The one hundred and thirty-first meeting of the American Institute of Mining and Metallurgical Engineers was held in

New York, February 16 to 20, with the largest registration of any previous meeting. The technical sessions were more largely attended and aroused more discussion than ever before.

There were joint meetings with Mining Section of the National Safety Council, under the auspices of the Industrial Relations Committee of the Institute, and two important lectures—the Howe Memorial Lecture, under the auspices of the Iron and Steel Committee, and the lecture by Dr. Carl Benedicks, of Sweden, on Corrosion, under the auspices of the Institute of Metals Division. The Petroleum Division conducted its annual Symposium on Oil.

J. V. W. Reynders, of New York, was elected president, to succeed William Kelly, of Iron Mountain, Michigan. Mr. Reynders was previously vice-president of the Institute. Among other things he has recently built the high bridge across the Hudson river at Poughkeepsie. E. De Golyer was elected first vice-president; F. F. Sharpless, secretary; and Percy E. Barbour, assistant secretary.

## **Rocky Mountain Coal Mining Institute Meeting**

The twentieth annual meeting of the Rocky Mountain Coal Mining Institute was held in Denver, February 16, 17 and 18. Discussions of mine safety and rock dusting methods occupied the best part of the sessions.

John B. Marks, of the Colorado Fuel & Iron Co., was elected president; H. H. Bubb, general superintendent of the American Smelting & Refining Co., at Cokedale, vice-president for Colorado; W. J. Reid, of the Lion Coal Co., vice-president for Utah; Gomer Reese, of the Kemmerer Coal Co., vice-president for Wyoming; William Moorehead, of the Phelps-Dodge Corp., vice-president for New Mexico; and Benedict Shubart, secretary-treasurer.

## **Plan Superpower Plant in Pennsylvania Coal Fields**

Establishment of a giant power generating station in Pennsylvania, regulation of future electrical development and steps to bring about reductions in electrical rates by indicating methods of economy in generation are recommended in the report of the Giant Power Survey Board submitted to the general assembly by Governor Pinchot. The plan con-

templates the erection of a coal-distillation plant capable of pretreating all the coal mined, using the high-grade product for domestic and industrial fuel and pulverizing the balance for the production of power. The plant would be located within a reasonable radius of mines having a combined capacity of 25,000 tons a day for not less than 50 years.

The statement is made that the sale of by-products is estimated to cover operating expenses and fixed charges of such a fuel-treating plant. An estimate of cost of such an undertaking is as follows: Coal treatment plant, \$34,000,000; power plant (\$70 per kw.), \$34,909,000; trunk line transmission, \$14,950,000, or a total cost of \$83,859,000.

## **Superpower Survey Being Made in Illinois**

Coincident with the above Pennsylvania superpower project is the survey being made in Illinois by C. M. Rau, Pennsylvania engineer, for a similar project, contemplated by Frank Farrington, president of the Illinois Mine Workers. Mr. Rau plans to make a preliminary survey of the coal industry first as a step toward determining the feasibility of the project, and expects to make recommendations soon.

## **U. M. W. Says Non-Union Miners Will Strike At Their Request**

In a statement issued at Fairmont, W. Va., by Van A. Bittner, representative of the United Mine Workers in that field, the prediction was made that the union would call a general strike on April 1, requesting every man working in the non-union mines to join the United Mine Workers. His statement reads: "The United Mine Workers of America will issue a general strike call requesting every man working in the non-union mines of Northern West Virginia to join the U. M. W. and strike on that date."

"The miners' organization has prepared plans to make this strike effective and it is the launching of the real offensive to organize every coal mine in Northern West Virginia. There can be no doubt that the men working in the non-union mines will respond to the strike call."

### May Repeal Pennsylvania Anthracite Tax—Hudson Coal Appeals Taxes

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## WITH THE MANUFACTURERS

### NEW EQUIPMENT CATALOGS

Morse Chain Company, Ithaca, N. Y., have engaged exhibition space No. 118 at the National Exposition of Coal Mining Equipment and Machinery of the American Mining Congress, to be held May 25 to 29 in Cincinnati. The exhibit will be under the charge of P. V. Stevenson, manager of the Morse Pittsburgh office, and of R. L. Phillips, of the Cleveland office.

An interesting exhibit is being provided, showing suitability of Morse silent chains for driving mine fans, pumps, conveyors, lineshafts, and other machinery. Samples of chains will be shown varying in pitch from  $\frac{3}{4}$  inch to 3 inches and assembled in widths for transmitting any amount of power from  $\frac{1}{4}$  to 5,000 horsepower. Lantern slides of typical installations of Morse chain drives will be shown. The unique operation of the Morse rocker joint, the outstanding feature of the Morse silent chain which replaces sliding friction at the joint with rocking or rolling motion, will be shown by means of a special optical device.

An extension rail for use in coal mines has been patented recently by a Charleston, West Virginia, coal operator, H. P. Tomkins, who estimates that its adoption will result in a saving to the company of from 7 to 12 cents per ton. The Tomkins extension rail can be laid in 30 seconds by the miner himself, without expense of track crew, without tools or supplies; is self-gauging and cannot spread or kick up; gives more head room in low coal; can be removed in 30 seconds for laying permanent track, or for operating any kind of machinery at face such as short wall cutters, leaders, etc.

The extension rails are channel members, grooved in the middle so that the flange of the car wheel can travel in it, and are designed to fit over the ordinary rail. No bolts, spikes, clamps or track tools are necessary. A combination handle and car stop prevents the car from running against the face and injuring the miner.

These rails are being manufactured of standard size at one of the large steel plants and are in use in mines in West Virginia and Pennsylvania.

Mr. Thos. F. Downing, Jr., General Manager, Logan County Coal Corporation, Lundale, West Virginia, announces the severing of his relations with that company and his affiliation, beginning April 1, with the Edw. V. d'Inville Engineering Company, City Center Bldg., Philadelphia, Pa.

The many uses to which the Skip Hoist method of handling materials may be effectively applied, are interestingly set forth in the text matter and illustrations of a new book just issued by Link-Belt Company manufacturers of elevating conveying and power transmission equipment.

The text matter explains fully the function of the Skip Hoist, and its relation to other types of mechanical equipment; tells where, and on what classes of work Link-Belt Skip Hoists are profitably used; gives complete details of operation, capacity, design and construction.

The illustrations are thoroughly in keeping with the text, supplementing it in such a way as to convey all the information which photographs and drawings alone can show clearly. Both drawings and photographs picture representative Link-Belt Skip Hoist installations of various types.

Copies of this interesting and informative publication will be sent to interested engineering and production executives. Ask for Book No. 546 addressing nearest office of the Link-Belt Company, or the Philadelphia, Indianapolis and Chicago offices of the Company.

A load indicating device for distribution transformers which compensates for ambient temperature is a recent development of the General Electric Company. The need for such an instrument has long been felt by the distribution engineer as up to this time there has been no practical way to keep reliably informed as to load conditions on distribution transformers. The device is to be known as the Type A thermotel, Cat. No. 270503.

This instrument consists fundamentally of two thermometers connected in series. The first thermometer is actuated by the heat of the transformer's top oil; the second, located in the external case, by the ambient temperature and modifies the reading of the first.

The composite reading given by the hand closely approximates the internal coil or hot spot temperature and, for convenience, is given in terms of "percent equivalent load." This is the percentage of the safe continuous output of the transformer, represented by the load cycle causing the indication.

The dial is calibrated from 50 to 125 percent equivalent load, indicating either underloaded or overloaded transformers. A semaphore is tripped by the mechanism, and swings into view when the instrument registers more than 100 percent, equivalent load.

Readings in excess of 100 percent show that the transformer is too small since it has carried a continuous load, or a short time overload equivalent to a continuous load sufficient to bring the internal winding temperature (hot spot) to 100 degrees C. or higher.

A resetting lever extends below the external case and, upon being reset, the instrument indicates the then existing load conditions on the transformer.

Other important features of this instrument are the ease with which it is installed, it being necessary only to lift the cover and slip the supporting arm over the edge of the tank, and the ambient correction which takes into account all variations in ambient temperature.

The Type A thermotel is suitable for use on a wide range of 60 cycle, pole type, distribution transformers.

"G. E. Welding Electrodes" is the title of a small 16-page illustrated booklet just issued by the General Electric Company. This booklet describes the characteristics and applications of the three types of General Electric electrode, designated as Types A, B and C. Brief instructions are given covering the use of each type.

A new catalogue of forged steel pipe flanges has just been issued by the American Spiral Pipe Works, Chicago, Ill. Primarily it is a handbook of valuable information for engineers, designers and operators of power systems. Formulas and data tables of vital information are so placed as to permit of quick and easy reference. It is among the first complete publications to embody the new American engineering standards of 400, 600 and 900 pounds w. s. p. There are also complete data covering existing standards. It is profusely illustrated with full-size cross sections, which, with tables and some halftone illustrations, intelligently convey the best modern practice in the field of increasing pressures and superheat. There is also an interesting section on corrugated steel furnaces. Copies will be sent free on requests made to the American Spiral Pipe Works, Chicago, Ill.

The Poole Engineering and Machine Company, manufacturers of Gears and Power Transmission Machinery since 1843, with main office and works: Baltimore, Md., just have issued two new bulletins, No. 105 and No. 106, showing new type reduction gear, which they have placed on the market.

The Central Frog and Switch Company, Cincinnati, Ohio, has just taken over the exclusive right for the sale of the "Handy Rail Clamp." In their announcement they say that the "Handy Rail Clamp" is all that its name implies. It is a track extension clamp, simple, easy to apply, no parts to get lost. Just lay the extension rail in position, slip the clamp under the track rail and extension rail, wedge with an ordinary track spike, and the extension track is ready for service.

Of interest to engineers with mine hoisting and haulage problems is the recent announcement by the American Cable Company of a new wire rope, known as Tru-lay, embodying in its construction a basic improvement over previous methods of manufacture.

From the standpoint of safety, mining engineers who have used Tru-lay rope are particularly commendatory. The fact that the rope does not unstrand makes splicing a comparatively simple operation.

Rope users have long known that Lang-lay rope has advantages over regular lay for certain sheave and drum work. While 80 percent of mine cable used in England and Europe is Lang-lay, it has been little used in the United States because of difficulties in splicing and handling. The preformed principle in Tru-lay rope is designed to meet this difficulty, making use of Lang-lay rope possible wherever desired.

To make available practically the entire strength of the new rope, the American Cable Company has developed for it a special steel fitting, without zinc, called Tru-loc. The Tru-loc fitting has not only proved dependable under ordinary conditions but also permits the use of turnbuckles, shackles, and other equipment used with rods and chains.

While particularly adaptable for mine hoisting work, Tru-lay rope is designed for use in every industry where dependable wire rope is a factor.

Full particulars may be obtained from American Cable Co., 105 Hudson Street, New York.

The Hill Clutch Machine and Foundry Company, of Cleveland, Ohio, have recently appointed T. S. Rose & Son as their representative in Pittsburgh and adjacent territory. Mr. Rose has been prominently identified in the Power Transmission field for better than 25 years and has excellent facilities for representing the comprehensive line of "Hill Clutch" Hill equipment, featuring:

"Smith Type" Hill Friction Clutches, "Cleveland Type" Collar Oiling Bearings, "Industrial Type" Spur Gear Speed Transformers, "Steelarz" Automatic Belt

Tighteners, Agitator Equipment of all kinds.

It is the intention of T. S. Rose & Son, located at 901 House Building, to give their clients a special engineering service in transmission problems.

### PACKING MACHINERY

In a report on the proper packing of commodities for shipment, the Department of Commerce refers to the practice of a mining machinery manufacturing company. This company uses spruce lumber, cement coated nails, and flat band iron. For lining, reinforced waterproof paper is used and for protection against rust the machine parts are greased with heavy oil. Thickness of lumber, number and size of nails, etc., for packing mining machinery are dependent on the nature of the material to be shipped. Heavy machines are first mounted on wooden skids, after which the box is framed around the machine, inside blocking holding the machine in place. Machines containing electrical parts and motors which are to be exported to far-distant countries are inclosed in a box made of 1½-inch matched spruce. This box is lined with waterproof paper and inclosed in an outside packing case made of 1½-inch matched spruce, securely strapped with band iron.

Slushing oils should be applied to machinery to prevent rust and corrosion.

Instructions for shipping chemical products, mineral oils and calcium carbide are also given. Regulations regarding shipments of petroleum to London are noted.

The report also covers details regarding the packing for shipment of iron and steel products, to guard against rust, bending or denting.

Office of the purchasing agent of Elkhorn Piney Coal Mining Company, formerly located at Huntington, W. Va., has been abolished, and the buying of supplies for commissary is done by the commissary managers, located at Powellton, W. Va., Stanaford, W. Va., and Weeksbury, Ky.

Mr. D. R. Phillips, manager of mines for this company, having passed away on December 27, 1924, is succeeded by Mr. Lew Roach, inspector of mines, with offices at Powellton, W. Va., and circulars, literature, etc., formerly forwarded to Mr. Phillips should now be forwarded to Mr. Roach.

Mr. J. H. Edwards, formerly electrical engineer for this company, is now an associate editor of the Coal Age, and advertising matter, circulars, etc., formerly directed to his attention, should now be addressed to the electrical engineer located at Stanaford, W. Va., Powellton, W. Va., and Weeksbury, Ky.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912,

Of THE MINING CONGRESS JOURNAL, published monthly at Washington, D. C., for April 1, 1925.

City of Washington,

District of Columbia, ss.:

Before me, a Notary Public, in and for the state and county aforesaid, personally appeared R. S. Mowatt, who, having been duly sworn according to law, deposes and says that she is the assistant business manager of the MINING CONGRESS JOURNAL, and that the following is, to the best of her knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in Section 411, Postal Laws and Regulations, printed on the reverse side of this form, to wit:

1. That the names and addresses of the publisher, editor, and business managers are:

Name of Publisher—The American Mining Congress.

Postoffice address—Washington, D. C. Editor, J. F. Callbreath; Managing Editor, E. R. Coombes; Business Manager, E. C. Porter.

2. That the owners are (give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 percent or more of the total amount of stock): The American Mining Congress—a corporation, not for profit. No stockholders. L. S. Cates, Pres., P. O. Box 1775, Salt Lake City, Utah. Daniel B. Wentz, first vice-pres., Land Title Bldg., Philadelphia, Pa. E. L. Doheny, second vice-pres., Securities Bldg., Los Angeles, Calif. Wm. H. Lindsey, third vice-pres., First Nat'l Bank Bldg., Nashville, Tenn. J. F. Callbreath, secretary, 841 Munsey Bldg., Washington, D. C.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are (if there are none, so state): None.

R. S. MOWATT,  
Assistant Business Manager.

Sworn to and subscribed before me this 24th day of March, 1925.

(SEAL) THOMAS C. WILLIS.

(My commission expires Jan. 10, 1927)

## CURRENT OIL SHALE NOTES

**MISS** Taisia Stadnichenko—a Russian refugee—until recently an instructor in chemistry at Vassar, is engaged in a new and highly important investigation into the actual change that occurs in the conversion of kerogen into gas and oil. It is known that the chemical elements of gas and oil, i. e., carbon and hydrogen, are present in the kerogen in the form of organic remains. Just what occurs when, under distillation, they reform themselves into gas and oil has long been a matter of observation and controversy. The work of Miss Stadnichenko consists of the construction of a new type of furnace in which the behavior of the oil shale, during the process of distillation, in an inert atmosphere, may be observed under the microscope. The oil shale under treatment is cut into thin sections so that the entire operation can be carefully observed. The experimental work is now, of course, in its early stages, but it has the encouragement of leading chemists, geologists, and physicists and will be continued in cooperation with the Research Committee of the American Association of Petroleum Technologists acting through the National Research Council. Miss Stadnichenko will work in Washington and will receive the support and assistance of the United States Geological Survey and the Carnegie Geophysical Laboratory.

**M. J. Trumble**, of Alhambra, Calif., has sold his patent rights to a group represented by the Associated Oil Company, the Pacific Oil Company, and Paul Shoup. Mr. Trumble will receive a substantial interest in the new company. Present plans cover continued experimental work on the Trumble process and the ultimate erection of commercial plants, presumably on oil shale lands owned by the Southern Pacific Company.

The new retort of the Var Coal and Oil Company, in the south of France, is proving a success with a production of 95 percent of possible oil production. The engineer in charge reports that retorting difficulties are virtually overcome and that production on a steady commercial scale can be depended upon. A refinery will be built at once.

**J. E. Hime**, of Chicago, who owns extensive oil shale land west of Green River, Wyoming, has purchased sufficient patent rights to erect a commercial-sized plant of the Trumble type on his Wyoming property. Work will begin this spring as soon as weather conditions permit. A carload of shale, treated by the Trumble process at Alhambra, Calif., gave satisfactory results.

The steady decrease in oil well production accompanied by increased demand and steadily mounting prices for crude oil and gasoline indicate that the day when oil shale plants will be putting crude oil and gasoline on the market is

not far distant. A price of \$2.50 a barrel for midcontinent crude is generally regarded as the critical price at which oil shale can compete successfully.

**E. H. Cunningham-Craig**, of London, estimates that the new plant of the Transvaal Oil, Ltd., at Ermelo, South Africa, will treat 80 tons a day of the rich Ermelo torbanite to yield from 80 to 105 gallons of oil to the ton. The company's property covers 25 square miles and is estimated to contain 15,000,000 tons of torbanite. An annual profit of \$400,000 is expected.

The oil shale industry in Scotland is often referred to as the one outstanding commercial oil shale operation. This is true; but its extent is not always appreciated. The company employs about 10,000 men and fully 40,000 are directly dependent upon it. Besides one candle factory, two coal mines, two sulphuric acid works, the company—*Scottish Oils, Ltd.*—has five refineries, 12 crude oil works, and 26 shale mines.

The development of the oil shale deposits of Estonia by foreign corporations, working under concessions from the government, is meeting with unexpected practical difficulties. The crux of the situation lies in a conflict between mineral rights and the Estonian agricultural laws. The expenses laid upon foreign oil shale operators is deemed excessive. Besides details of operation are burdensome e. g., an oil shale plant must first receive the approval of a governmental board; the period allowed for experimental work is very short; after experimental work is completed the original owner has the first claim to purchase; thus the concessionnaire is never sure of a good title; finally the government reserves the right to cancel a concession at a moment's notice in case of any real or fancied failure to abide by the terms of contract.

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## NAVAL PETROLEUM RESERVE NO. 4

**THE** exploration of Naval Petroleum Reserve No. 4 in northern Alaska on behalf of the Navy Department will be continued by the Geological Survey.

This party, in charge of **Gerald FitzGerald**, topographer, with **Walter R. Smith**, geologist, sailed from Seattle, February 28, for Seward, and from Seward they will go to Nenana, on Tanana River.

The party expects to explore the unknown region between the head of Pitmegea and Utukok rivers during the summer, perhaps descending the Utukok until they have connected their surveys with those made in 1924 by **W. T. Foran**, geologist, and **O. Lee Wix**, topographer. If time permits they will then work eastward and, if possible, find a pass into the upper part of Meade River basin and connect with the surveys made last year by **Philip S. Smith** and **R. K. Lynt**, at the head of the Ikpiukuk and the western fork of the Colville.

This work will probably last all summer and may run into the fall. It is impossible to decide how the party will get out of the region until the members have acquainted themselves with the local conditions. Possibly the party may continue northward, follow down some of the large streams of the region to the Arctic coast, and come out at the settlements of Wainwright or Barrow. On the other hand, they may find it advantageous to turn southward and attempt to discover a portage into some stream tributary to the Noatak and then follow that river down to Kotzebue, on the coast. At any of the coast settlements trading vessels can probably be found to take the party to Nome.

This will be Topographer FitzGerald's third year in topographic exploration of the Naval Petroleum Reserve, and he is, therefore, familiar with the work already done and with the conditions that his party will encounter. Geologist Smith, his associate, has made a special study of the rocks that are most likely to furnish petroleum in this region. During the last four years he has made investigations for the Geological Survey in the oil fields of the Alaska Peninsula.

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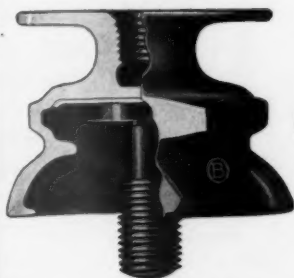
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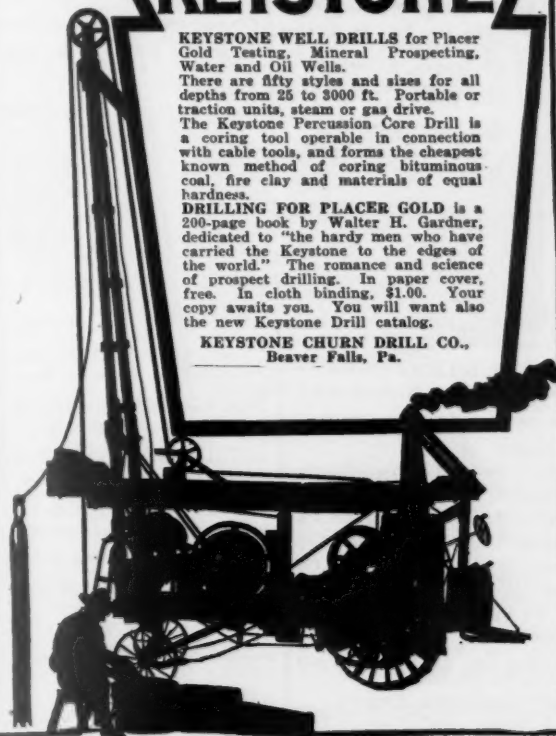
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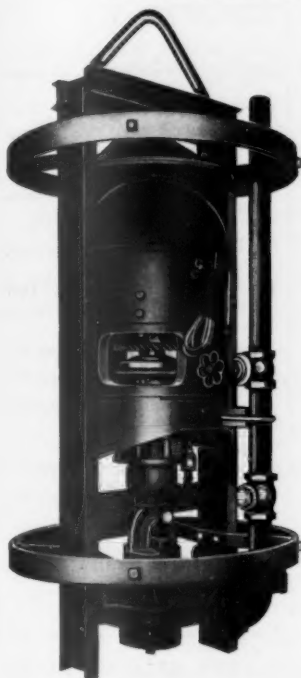
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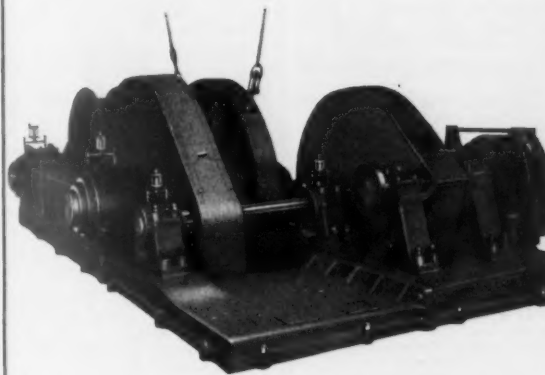
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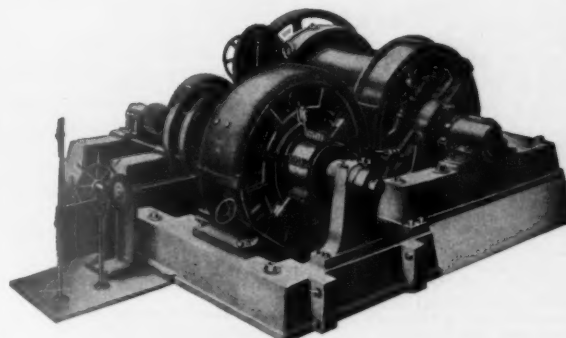
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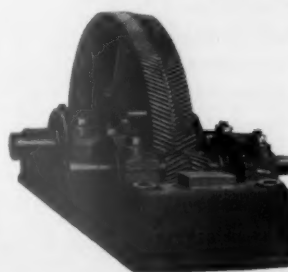
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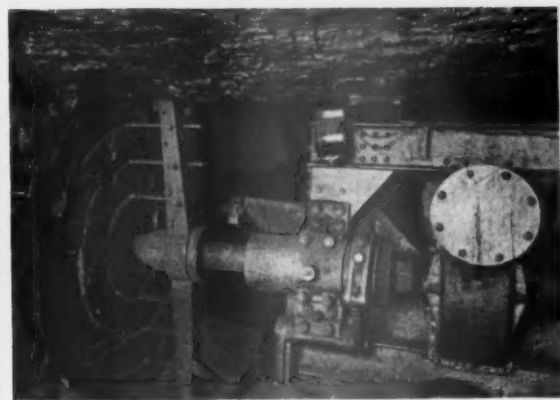
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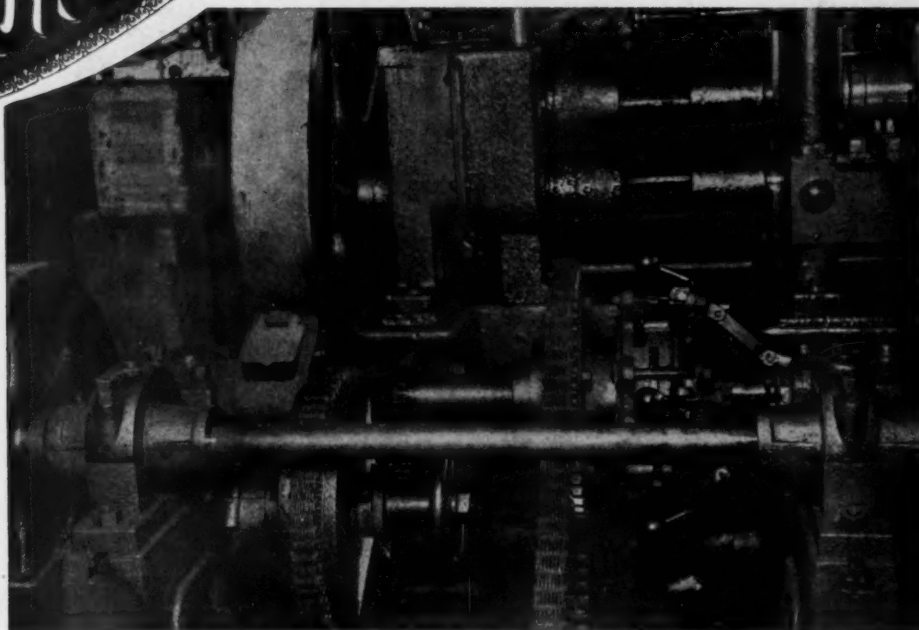
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